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PART II.

INVESTIGATIONS ON THE CONTROL OF DISEASE IN PLANTS.

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[Read July 15 and 29; Lieut.-Col. Sir DAVID PRAIN, F.R.S., V.M.H., in the
Chair.]

[BEING THE NINTH AND TENTH MASTERS MEMORIAL LECTURES.]

IN choosing the control of disease in plants as a subject for the Masters Memorial Lectures for this year I have been largely influenced by the fact that it is commonly assumed, and I think rightly, that the losses caused by disease are becoming increasingly serious. Apart altogether from the fact that our rapidly extending knowledge of fungoid pests has led to the recognition of many new diseases, the importance of the subject has increased owing to those economic changes which have led to the cultivation of larger areas of one and the same kind of plant. In growing fruit, for instance, it is now a common practice to plant considerable breadths of one variety only, instead of, as one sees in the older orchards of the west of England, a mixture of different varieties. Should this single variety prove susceptible to any particular disease, that disease has every opportunity of spreading throughout the area—as silver-leaf has spread wholesale in orchards of ‘Victoria’ plums, for instance—whereas in mixed plantations only occasional trees would be attacked. Again, crops are grown on a larger scale than was formerly the case. Potatos, for instance, form an almost continuous network in some counties, with the result that an epidemic starting in one locality, given favourable conditions of weather, can quickly spread over the whole area. Further, the

increasing rapidity of transport nowadays is leading to the importation of plants from abroad in ever-increasing amount, with the result that fungoid pests are introduced with them. These may, or may not, obtain a hold in this country, but when they succeed in establishing themselves, as the potato disease and American gooseberry mildew have, the consequences are often particularly serious. Unfortunately these unwitting importations of disease are often made by persons with little or no knowledge of the harm that may result, and the disease is established ineradicably before it is recognized and means taken to stamp it out. Such a state of affairs can only be dealt with by legislation and a thorough control of such importations by the State, though even under such conditions it is very problematical whether diseases we do not at present possess can be kept out indefinitely.

I propose then to deal briefly with the methods which are being tried, for the most part experimentally, for the control of plant diseases, limiting the subject to diseases caused by the attacks of parasitic fungi.

The most popular method unquestionably is to coat the plants on which disease has either appeared or is expected to appear with a dust-like film of some fungicide, applying it in the form of a fine spray or as a powder, preferably the former. Many fungicides are now in use, some suitable for one disease, some for another. No universal specific has yet been found, in spite of endless investigations during the last decade or so.

Of all the fungicides now in use, Bordeaux mixture is unquestionably the most important. It can be relied upon to keep more than one of the worst of the fungoid diseases in check, yet even in the case of the potato disease (*Phytophthora infestans*) large growers are occasionally met with who consider that the drawbacks to its use are greater than the undoubted benefits it confers. They argue that in wet seasons, when the disease is most prevalent, spraying can only be carried out with difficulty; that the repeated sprayings frequently necessary are costly; that the preparation of the mixture requires more skill than their employees possess; and finally that spraying so delays the maturation of the crop that it cannot be lifted until some three weeks later than an unsprayed crop. The cumulative effect of these drawbacks is that many prefer to risk the partial destruction of their crops season by season. Yet this particular disease is perhaps more readily kept within limits than any other serious one attacking our crops, and moreover the mere coating of the plants with the fungicide undoubtedly, apart from all questions of preventing losses, increases the crop considerably.

In such circumstances it is hardly to be wondered at that there is a tendency nowadays to look for other methods of controlling the outbreaks of disease caused by parasitic fungi.

Where crops are grown under glass, and consequently such conditions as temperature, water-content of the atmosphere, and again of the soil are largely capable of control, a certain amount can be done

towards providing external conditions unsuitable for the growth of these pests. Nevertheless commercial crops of such plants as cucumbers are deliberately grown under the identical conditions the mycologist uses when he requires to carry out infection experiments. The plants are forced as rapidly as possible, with the result that the tissues are far more succulent than they should be, and the high temperatures and saturated atmosphere, often so requisite for the germination of fungus spores and the growth of their mycelium, are provided. In such circumstances one cannot wonder that the plants readily fall a prey to fungoid attacks which, under such conditions, are excessively difficult, if not impossible at present, to cope with. There can be little doubt that critical investigations on the best methods of cultivating such plants under glass would modify existing methods in a direction which would provide less ideal conditions for the spread of fungoid pests. Even in the open much can be effected by a judicious choice of external conditions. Larch canker, for example, has to a certain extent been kept under control by avoiding planting in situations known to offer especially favourable conditions to the fungus causing it.

Whilst temperature and water-content in many cases play an important part in the incidence of plant diseases, the supply of food and other materials in the soil is often of the greatest importance. The rapidly increasing employment of artificial manures is gradually calling attention to this fact by demonstrating that the more intensive cultivation becomes the more plant diseases abound. As evidence for this the following table showing the intensity of an outbreak of yellow rust on the wheat plots at Rothamsted is worthy of some attention.* Throughout the plots the variety of wheat grown was the same, the plots only differing in the manurial dressing applied. This is given in column I., whilst in column II. are marks assigned to each plot on the basis that 0 indicates no disease, 12 an excessively bad attack.

TABLE.	
I.—Manure.	II.—Extent of Disease.
None	1-2
Minerals	2
Minerals + 200 lb. ammonium salts	3
„ + 600 lb. „ „	3-4
„ + nitrate of soda	3
Ammonium salts only	6-7
„ „ and superphosphate	10
„ „ „ „ and sulphate of magnesia	12
Ammonium salts } alternating each season	{ 3-4
Minerals }	{ 0
Rape cake	8
Minerals + 550 lb. nitrate of soda	9-10

A similar investigation of the manurial wheat plots on the Woburn Experimental Farm of the Royal Agricultural Society revealed a very similar state of affairs, whilst water-culture experiments designed

* BIFFEN, R. H., *Journ. Agric. Sci.* vol. iv. p. 425.

to test the matter further gave similar results. The results may be summarized by saying that susceptibility to this particular disease is increased by supplying the growing plants with large amounts of available nitrogen. There is little to choose, as a rule, between the evil effects of nitrate of soda and of sulphate of ammonia. On the other hand, mineral manures, more especially the salts of potash, decrease susceptibility, whilst starvation, *e.g.* on the unmanured plot which has grown wheat continuously for many years, leads to a marked degree of disease-resistance. In fact, by starving highly susceptible varieties practically immune plants can be grown. Unfortunately such treatment, though it checks the incidence of disease, does not lead to the production of profitable crops, and the most the cultivator can do is to strike a balance for himself and decide, as far as may be, what particular system of manuring will give him, on the whole, the most profitable crop. It is too early to say yet how far these results apply generally, but tentative experiments carried out with Roses, Hollyhocks, and Chrysanthemums seem to indicate that dressings of potassium phosphate may help considerably in preventing severe attacks of the diseases these plants are liable to.

These observations suggested an interesting line of inquiry which is being followed up by SPINKS,* namely, the effects of various salts, not usually available for plant growth, on the disease-resisting capacity of plants. His preliminary observations were made at the Pot Culture Station at Woburn. Here cultures of wheat were being grown under uniform conditions, except that traces of salts had been added to the soil. The plants had become attacked with the common mildew, *Erysiphe graminis*, and there was no reason for supposing that all of the plants had not had precisely the same opportunities for becoming infected. The cultures growing in normal soil were moderately attacked, the intensity of the disease being expressed by 4 marks. The addition of magnesia resulted in a more severe attack, 8 marks being assigned to these cultures. Zinc salts gave variable results. The carbonate slightly decreased the severity of the attack as compared with the control plants in normal soil (3 and 4 marks respectively), the phosphate produced no effect on the amount of the disease, whilst the nitrate increased the severity of the attack to an extraordinary extent (10 marks). The corresponding salts of lead gave much the same result, the nitrate again markedly increasing the amount of mildew present. The addition of traces of lithium salts, on the contrary, served to diminish the severity of the attack. The phosphate and carbonate produced practical immunity in the plants, whilst, with the exception of one case, the nitrate also diminished the amount of disease compared with that on the control plants. Various experiments have since confirmed and extended these results, and we now have to recognize that the merest traces of different salts may profoundly modify the plant's susceptibility to disease. The lines these observations open up look to be of great promise, for they indicate the

* SPINKS, *Journ. Agric. Sci.* vol. v. p. 231.

possibility of controlling disease by the addition of almost negligible amounts of salts to the soil.

A still more direct way of minimizing the losses caused by fungi is to cultivate disease-resistant plants. It appears to be almost invariably the case that when many varieties of any plant are grown under the same external conditions they show considerable differences in their capacity to resist disease. Some few may even be found which are practically immune.

Unfortunately, immunity to any particular disease is not necessarily associated with other characters almost equally desirable from the cultivator's point of view. For instance, the potato 'Evergood' possesses a considerable capacity to withstand the attacks of *Phytophthora infestans*, but it can never come into such general cultivation as the susceptible 'Up-to-Date,' simply because in many districts the quality of its tubers is far from desirable. Hence the question arises whether immunity to disease and its converse susceptibility are heritable characters. If so, it would seem possible by cross-breeding to associate the valuable feature of immunity with the other characteristics the cultivator requires.

A brief survey of more than one of our garden plants indicates that such is the case, but really critical data are difficult to obtain, owing to the lack of precise knowledge with regard to the origin of many, if not of most, garden varieties. The numerous varieties of Roses in cultivation nowadays provide the best evidence in this direction, and fortunately the pedigrees of many are known with some degree of certainty. Further, the Rose is ideal from another standpoint, though possibly one not appreciated by the grower, for it happens to be attacked by a considerable number of fungoid pests, chief of which are the rose mildew, orange rust, and black spot. These fungi appear with great regularity each season, and consequently offer good material for investigating the phenomena of disease susceptibility.

Three groups of "florists'" Roses are generally recognized. These are the Teas, the Hybrid Perpetuals, and the Hybrid Teas. The Teas and Hybrid Perpetuals form two sharply marked groups easily distinguished by their foliage and floral characters. The third group, the Hybrid Teas, have resulted from crosses between members of the first two groups. Some are first crosses, others seedlings from first crosses. Naturally the limits of the group are somewhat ill-defined, and the raisers of new Roses often arbitrarily class their novelties as Hybrid Teas when the ordinary observer is inclined to put them in other groups. This is in part due to the fact that it is not generally recognized that when such first crosses are again crossed the resulting offspring shows segregation into each of the three classes. The Tea Roses as a group are characterized by the fact that they are, to quote FOSTER MELLIAR, "particularly exempt from orange rust." The Hybrid Perpetuals, on the other hand, can fairly be described as particularly susceptible to it. The Hybrids from these two groups are worthy of extended investigation with regard to their capacity

towards resisting rust. A somewhat cursory survey shows that some are as susceptible to orange rust as the Hybrid Perpetuals. Examples which will occur to most rose-growers are 'Mrs. W. J. Grant,' 'Lady Ashtown,' 'Liberty,' and 'Camoens.' Climbing "sports" of the first three exist, and these in turn are as susceptible as the types from which they sprang. Other varieties, on the other hand, possess a marked degree of resistance. Amongst such are 'Laurent Carle,' 'Edme Metz,' and 'Princess Marie Mertchertsy.' Further, some of the newer Tea Roses are rust-susceptible. As an example that superb Rose 'Mrs. Foley Hobbs' must suffice. Its pedigree is unknown to me, and I can only hazard a guess that a Hybrid Tea carrying the factor for susceptibility was one of its parents.

The incidence of the rose mildew on the newer races of Roses again points to the fact that immunity and susceptibility are transferable on cross-breeding. The new race of Wichuraiana Roses, which have so altered the appearance of our rose gardens in the last few years, gives almost convincing proof of the fact. These Wichuraianas are descended from the species *Rosa Wichuraiana* crossed with various Teas, Hybrid Teas, Hybrid Perpetuals, &c. The species itself shows an intense degree of resistance to mildew, whilst this is not necessarily true of the other parents. It is customary to speak of the whole class as being mildew-proof, the hard, polished leaves being supposed to be impenetrable by the fungus. As a matter of fact, many are badly attacked during mildew years, and if one looks up the pedigrees of these varieties one finds that susceptible forms have been used in their up-building.

'René André,' for instance, is *R. Wichuraiana* × 'L'Idéal,' 'Diabolo' is *R. Wichuraiana* × 'Xavier Olibo,' 'Léontine Gervais' *R. Wichuraiana* × 'Souvenir de Catherine Guillot,' 'Dorothy Perkins' *R. Wichuraiana* × 'Mme. Gabriel Luizet'; whilst the latest comer, 'Wich-Moss,' has inherited the habit and foliage of *R. Wichuraiana* and the multitudinous prickles of the Moss Rose, together with its susceptibility to mildew.

The third disease, black spot, is at present far less common than either rust or mildew, though it appears to be becoming more abundant each season. It is, as a rule, common on the Persian Yellow Rose. This variety crossed with 'Antoine Ducher' gave the equally susceptible 'Soleil d'Or,' which in turn "sported" the susceptible 'Soleil d'Angers.' The former has been the starting-point of the new race of Pernetiana Roses. It is early to speak of the incidence of black spot on these, but one of the most widely grown, the 'Lyon Rose,' rarely fails to provide me with an outbreak of the disease.

A vague recognition of similar facts has led plant-breeders to make the attempt to transfer the feature of immunity definitely to varieties good in other respects, but lacking it, with some measure of success.

ORTON and his colleagues,* for instance, have bred new varieties of Cowpeas and Water-Melons resistant to a wilt-disease caused by the

* ORTON, C.R. IV^e, *Con. Inter. de Génétique*, p. 247.

attacks of a *Fusarium*. In the former case a resistant variety, 'Iron,' was found in cultivation in South Carolina. This was crossed with the more widely grown and more prolific variety 'Whip-poor-Will,' and amongst the descendants of the cross-bred plants, varieties resistant not only to the fungoid disease but to a common insect disease causing knots and nodules on the root system were found. In the latter case a starting-point could not be found amongst the edible Water-Melons, but an inedible Citron-Melon was found to be wilt-resistant. This, crossed with the Water-Melon 'Eden,' finally gave a few edible resistant plants which have proved the forerunners of new races suitable for cultivation in districts where "wilt" is particularly prevalent.

If, however, any definite progress is to be made in the work of raising disease-resistant plants, more precise knowledge is necessary with regard to the mode of inheritance of this feature. The days of chance results in plant-breeding are over. We have long passed the stage when the breeder vaguely recognized that crossing "broke the type," and crosses were made at hazard in the hope that among their descendants improvements on the parents would occur.

The investigation of the subject has its own special difficulties. To begin with, it is as well to work with some fungoid disease which can be relied upon to appear with regularity each season and sufficiently intensely to attack every susceptible plant. Further, the mortality amongst infected plants should be as slight as possible, for if it is at all pronounced the experiments may come to a premature end through the death of the first hybrid generation. Pronounced mortality may also upset the necessary statistical examination in the succeeding generations. Add to this such other desirable points as MENDEL postulated for his experiments, such as the existence of numbers of varieties breeding true to the features under investigation, fertility of the cross-breds, &c., and one's choice becomes exceedingly limited. Possibly wheat and its common pest in this country, namely the yellow rust, provides as ideal a subject as can be found. One or two varieties are known which are so resistant to the attacks of the fungus that they fail to become infected under the most favourable conditions. There are also numbers of moderately and very susceptible varieties which will cross readily with these immune varieties, whilst the hybrids self-pollinate with extraordinary certainty. Crosses made between such immune and susceptible varieties show dominance of susceptibility to yellow rust in the hybrid generation, segregation into immune and susceptible forms in the next generation, the two forms occurring in the proportion of one to three, whilst the immune forms breed true to this feature in following generations. If all plants showing the pustules of the rust are counted as susceptible, then the mode of inheritance is on simple Mendelian lines. The susceptibility, though, is not invariably of the same order as in the parent susceptible variety, and, to put the matter broadly, it may grade from "slight" to "extreme." It is known further that moderately resistant forms appearing in the first generation raised from the hybrid may breed true to

“moderate” susceptibility, so that the presence of factors checking the intensity of susceptibility has to be recognized.

Further, crosses made between “slightly” and “moderately” susceptible varieties often give, in the generation raised from the hybrid, forms far more susceptible than the “moderate” parent. This is particularly the case in crosses between ‘Rivet’ wheat (slightly) and ‘Red Fife’ (moderately susceptible), where forms excessively susceptible to yellow rust appear in the generation raised from the hybrid. These in turn may breed true to this feature. The statistical investigation of the phenomena is a matter of considerable importance, but unfortunately it is proving difficult, owing to the partial sterility of many of these new forms. Strikingly enough, with this increased susceptibility to a disease to which one at least of the parents is liable, one may find susceptibility to other diseases not known to occur in them. The production of races of wheat readily attacked by ergot from the cross between ‘Rivet’ and ‘Red Fife’ is a case in point.* The fact that such may occur is, however, a small matter to set against the undoubted advantages of breeding directly for disease-resistance. The recognition of the fact that immunity and susceptibility to certain diseases are capable of segregation in either a simple or complex Mendelian fashion has led to a great effort to control some of the commoner diseases to which our crops are liable, and breeding for disease-resistance has become part of the routine work of many experimental plant-breeding stations. Results in this direction cannot, from the nature of the work, be expected rapidly, though some of considerable economic significance are already to hand. Meanwhile the way for further progress might well be paved by those Horticultural and Agricultural Institutions which make trials of large numbers of varieties of the more important garden and farm plants, collecting information with regard to their susceptibility or otherwise to various diseases.

The CHAIRMAN said that he had been particularly interested in Professor Biffen’s remarks, in the earlier part of his lecture, suggesting that the increased feeding of plants seemed to render them more susceptible to disease, and thought that it indicated that what is now popularly known as “intensive cultivation” might soon be on its trial for the reason stated in the lecture. He also thought that growers might themselves exert great influence in stamping out disease by insisting on receiving for their cultivation only varieties which are immune, or practically immune, from those forms of disease to which the species concerned are more commonly subject.

Mr. BATESON asked whether there was any truth in the popular view that disease-resistance was probably associated with “inferiority.” Varieties might of course be inferior in many distinct ways, but perhaps small size and a deficiency of sugars or of aromatic substances were the most usual elements of inferiority in edible plants. Did Professor

* BIFFEN, R. H., *Journ. Agric. Sci.*, vol. iv, p. 426.

Biffen's experience lead him to suppose that there was any physiological relationship between such defects and the power to resist diseases?

Mr. ARTHUR SUTTON said he was very glad of the opportunity of saying a few words, more especially with regard to the diseases of the potato, which the lecturer had so ably dealt with.

Referring to the question whether the spores of *Phytophthora* affected the potato plant directly through the tubers or through the leaves, Mr. SUTTON called attention to the well-known fact that it is quite easy to grow a healthy crop of potatoes from seed-tubers which were themselves very badly affected with *Phytophthora*, and in fact so long as there were some remaining eyes in a seed-tuber which were sound there was nothing to prevent a healthy crop being grown, provided the climatic conditions in the ensuing season did not favour the spread of *Phytophthora*.

Mr. SUTTON also mentioned that healthy crops of potatoes were frequently grown on land which had produced a very badly diseased crop of potatoes in the previous season, and the conclusion to be drawn seemed to be that the spores of *Phytophthora* only became a source of danger when the climatic conditions were favourable to their growth. In some parts of Ayrshire remarkably heavy crops of early potatoes were grown on land where potatoes had been grown successively for forty years—sometimes the crops being affected with disease and sometimes not, according to the character of the season.

Referring to the question dealt with by the lecturer, as to whether varieties of potatoes which were immune to the attacks of *Phytophthora* could be considered in any respect "inferior" to others which succumbed to the disease, Mr. SUTTON stated that in his experience many thousands of seedling potatoes were discarded because in some character or other they were "inferior" to others already in commerce. It frequently happened that seedlings which for several years showed immunity to *Phytophthora* were far less productive than others, or were in other respects "inferior," possibly in quality, or in shape, or in colour.

The general conclusion which cultivators seemed to draw was that it paid better to grow a very productive variety of good or fair quality, taking the uncertain risk of *Phytophthora*, rather than to grow sorts which would probably be immune but which would certainly yield a relatively small crop. The most immune variety of potato Mr. SUTTON has ever known was one which never yielded more than half the crop of the well-known 'Up-to-Date.' On the other hand, the old favourite, 'Magnum Bonum,' was not only relatively immune for a great number of years, but was also very productive and of fair table quality.

The lecturer had not referred to the Wart Disease (*Synchytrium endobioticum*). This, up to the present, has only appeared in certain districts of the country, but the number of outbreaks is increasing year by year, and when the disease does appear it is far more destructive than *Phytophthora*; not only are the tubers rendered absolutely

useless, but successive crops of the same potato on the same land are certain to be attacked, and it is impossible to grow varieties of potato which are liable to this disease for several years without the certainty of their being attacked. Fortunately, however, there are several varieties of potato which are absolutely immune to the Wart Disease, and these are the only sorts which the Board of Agriculture allow to be planted on land which has once been affected by the Wart Disease.

Nothing perhaps is more interesting or remarkable in the experience of potato-growers than the striking immunity of such sorts as 'Langworthy,' 'Sutton's Supreme,' 'Conquest,' 'Abundance,' 'What's Wanted,' 'White City,' and 'Great Scot' to the attacks of *Synchytrium endobioticum*.

Mr. G. MASSEE pointed out that the effect of different minerals or fertilizing substances as affecting the relative susceptibility of plants to injury by fungi was not a new idea. As a boy on his father's farm he learned from others that the use of nitrate of soda favoured the development of rust on cereals, more especially barley.

He drew attention to the following points in relation to diseases of plants caused by fungi:—

Fungi in general are to-day credited with doing much more harm to plants than they do in reality. Apart from the rusts, smuts and mildews, it is an open question as to how many fungi are the *primary* cause of disease, but given a chance due to some previous weakness on the part of the host-plant, such fungi can gain a foothold and work havoc, and as such havoc is obvious the fungus is too frequently considered as the *primary* and sole cause of injury, whereas but for some previous weakness the said fungus could not have attacked the plant. In such cases fighting the fungus does not strike at the root of the matter, and good results cannot be attained, as everyday experience abundantly proves.

The favourite occupation of working out the so-called life history or cytology of a fungus, although valuable in proportion to its accuracy, does not indicate the primary cause of disease, which in the majority of cases—except in the rusts, smuts, and mildews—is a physiological problem, a problem invariably shirked, probably on account of the difficulties it embodies. There must be a definite reason why certain plants remain immune when every chance of infection is present. To select and breed from such immune specimens is a rule-of-thumb method. The "why" is the question to be settled once for all, so as to give the clue. A better knowledge of plant physiology appears to be the only hope for elucidating the matter, and should be forwarded at all costs. Plant pathology, so far as fungi are concerned, can only state, with more or less accuracy, the fungus present, and suggest means for preventing its spread.

He had no doubt that immune plants can be produced in any given place if sufficient attention is given to the subject, but common experience has proved that such plants, when cultivated at a distance

from their place of origin, lose their immune properties, and in many instances are exceptionally susceptible to disease under such conditions. Marked instances of this condition of things are found in the varieties of wheat immune, as grown in Australia, but, when imported into the United States, found highly susceptible to the disease to which it was immune at home. The same experience followed the introduction of immune Indian cowpeas to the United States. Such instances could be multiplied almost indefinitely, and appear to suggest that immunity appears in some way to be influenced by the conditions under which it was produced, food, climatic conditions, &c. Again, in attempting to produce immune forms, the idea appears to be that of modifying the plant in such manner that its fungus parasite is unable to attack it, forgetting or ignoring the fact that a fungus is as capable of modifying its mode of attack as its host-plant is of repelling it. I have demonstrated that fungi known only as saprophytes can be educated to become rampant parasites, so much so that they can no longer live as saprophytes, but, by reversing the process, can be brought back again to a saprophytic condition. Others have done the same, and, knowing the adaptability of fungi generally, I would back fungus to win against any process of immunity that can be acquired by higher plants, granted time and opportunity.

In replying, the LECTURER pointed out the difficulty of obtaining sufficiently critical evidence to deal with these views. That a rapid change on the part of the fungus was likely seemed to be negatived by historical evidence, for the oldest known wheat in cultivation, 'Einkorn,' was characterized by an extraordinary degree of immunity, not merely to our common rust, but to two others as well. Yet these parasites had presumably had the opportunity of changing their habits from the time the second town of Troy was built up to the present. The question of the failure of a variety known to be disease-resistant in one locality when transferred to another required careful consideration before it was assumed that the failure was due to any change in its power of resistance to disease. The question of failure was largely an economic one, and if the variety in question did not succeed as well as those already established in the new locality it naturally went out of cultivation. Such was the case with FARRER'S Wheat 'Bobs' in South Africa: it simply proved unsuitable for the new climatic conditions. That the failure was not due to any changed disease-resistance was shown by the fact that POLE EVANS used this variety as a parent plant in his cross-breeding experiments, owing to its immunity to the very rust for which FARRER claimed it possessed a great power of resistance in Australia.

The lecturer did not think inferior strains were more disease-resistant than those of good quality. That it was a rare character combined with the many that go to make superiority was readily intelligible. A more definite answer could be given only after attempting to combine disease-resistance with "quality."

THE COCO-NUT PALM (*COCOS NUCIFERA*, LINN.)

By SIR EVERARD IM THURN, K.C.M.G., C.B.

(Read May 14, 1913: Field-Marshal Lord GRENFELL, G.C.B., G.C.M.G., in the Chair.)

By word of mouth and by help of certain pictures which I have accumulated during a long life spent in various lands where the coco-nut palm is often the main feature in the landscape, I propose to tell you enough of the appearance, the history, and the uses of the coco-nut palm to leave you with a clear idea of what this tree is like.

The nut-bearing coco-nut palm (*Cocos nucifera*) is not cultivated for ornamental purposes in European hothouses; for, unlike the many palms so used—and unlike many species even of its own genus—this palm is not beautiful when young—or perhaps ever, at least until it reaches an old and very large state. It is one of the half-dozen most important and most interesting of tropical plants; yet, though it is almost impossible to find a book on life or travel in the tropics which is without some mention of this palm, or to take up a newspaper which in any way deals with commerce and the markets without coming across some reference to the nuts, I very much doubt if there are many people who have passed their lives in temperate climates who have any idea what the tree looks like or even know anything of the nut, except perhaps that it is or was set up at country fairs to be knocked down by the lucky ones at a penny a shy, and perhaps that nowadays it enters into the composition of margarine and consequently of “butter.”

First of all I should like to say something of the name by which this tropical nut has become known to all people of Western origin. It is a curious little study in word origins.

The nut seems to have been first heard of in Europe from travellers in the East Indies—where, however, the palm was probably not originally native; and till nearly the end of the fifteenth century the fruit seems always to have been referred to simply as “the Indian nut.” It must here be remembered that up to that time the great usefulness of the fruit was not recognized even in the East Indies, and that the Pacific Ocean—which it can hardly be doubted was the original home of this useful species of the genus *Cocos*—had not then been discovered. Consequently the nut was then known only as a more or less interesting curiosity. The earliest use of another name seems to have been in 1498 or 1499 by the Portuguese traveller VASCO DA GAMA, who, obviously on account of the now very well-known monkey-faced appearance of the nut when deprived of its thick enveloping husk, applied to it the Portuguese (and Spanish) word *coco*, which means “a grin,” “a grimace,” or a “face” (as in the phrase “he made a

face '') ; and this name *coco* (plural *coco*es) caught on and was adopted generally by English and other European writers. Next, when Dr. JOHNSON'S dictionary was being printed, by mistake the article on what JOHNSON himself elsewhere habitually wrote of as "coco" or "cocoes" (*i.e.* the old "Indian nut") was, evidently by some careless editor, run together with the article on that very different tropical product which, by an adaptation of its native Mexican name *cacaoutl*, was called "cocoa" (or more properly "cacao"). From that time till quite recently the form "cocoa-nut" has been used almost universally even by educated people ; but I confess I was rather troubled in mind when I found I was advertised to speak to you to-day of cocoa-nuts instead of coco-nuts.

It may be added that it was apparently in order to avoid confusion between the two similarly-named commercial products that the palm-fruit was long known in London commercial circles, and consequently at country fairs, as "koker-nuts" or simply "kokers."

An old friend of mine, towards the end of a long life, most of which was spent in the tropics, used to complain of the long straight rows of coco-nut trees which, with the huge rectangular blocks of sugar-canes, made most of the scenery in a land where, whether the air was dry or saturated with moisture, it was always hot ; he said that the palms reminded him of worn-out stable mops standing on end.

The coco-nut—like most other palms—is essentially of very simple form, almost as simple as the toy tree of a Noah's ark. It consists, normally, of an unbranched stem, rather shapeless and even gouty-looking, from the top of which spring the comparatively few but large leaves and the comparatively small spikes which carry the flowers and fruit. The youngest post-impressionist artist should have no difficulty in setting down on paper something recognizable as such a typical palm. As a matter of fact, the draughtsmen who accompanied the earlier travellers through lands where the coco-nut flourished generally contented themselves with indicating the palms which they saw in this simple sort of way, as may be seen in the drawings of Captain SAMUEL WALLIS, who, with Captain COOK, was one of the earliest, at the end of the eighteenth century, to investigate the Pacific islands ; and the drawings which, about fifty years later, Captain BEECHEY, of H.M.S. *Blossom*, brought back are hardly better in their representation of the distinctive character of the coco-nut palm.

It took much closer observation than these earlier travellers could give to detect the details of form and arrangement of parts sufficiently to enable an artist to set down on paper lines which suggest anything like the real aspect of a palm, and how the general aspect of one palm differs from that of another. As a matter of fact the minute differences are innumerable, and often very difficult to detect even by the man with the most experienced eye ; yet it is perhaps possible briefly to indicate enough of these to make plain—at any rate with the help of pictures—what a coco-nut palm is like, and wherein

it differs in general appearance from other palms. Briefly, the really telling differences are to be found chiefly in the form of the trunk, in the curve of the midrib of the leaf, in the way in which the leaflets are set on the midrib, and in the curve of these leaflets.

I cannot better sum up the characteristic appearance of the coco-nut palm than in the words of Dr. ALFRED RUSSEL WALLACE, written many years ago (1853), after his travels with BATES on the Amazon. In his book on "The Palms of the Amazon" (in which, by the way, the verbal descriptions are, to my mind, much better than *from an artistic point of view* are the drawings) he wrote of the coco-nut palm: "The leaves are large, terminal, and regularly pinnate. The leaflets are rigid, and spread out very flat on each side of the midrib. . . . Its peculiar characteristic is the rigidity of its leaves, which curve or droop very slightly, and the leaflets spread out with remarkable flatness and rigidity . . . the whole tree has not that light and feathery appearance which it is often represented as possessing."

The normal appearance of this palm, in its adult state, is as in figure 129 taken on the beach in Fanning Island, a lonely little coral atoll far away in the north central Pacific.

Abnormal growth seems to be rare in palms generally, and, if I may judge from my own rather wide experience, is perhaps especially rare in the coco-nut. I have, however, come across a few very curious variations, of which I can show you the following pictures. The first is of a tree growing in the garden of Government House in Fiji (fig. 125). In this the peculiarity will at once be noticed that the leaflets separate very imperfectly from each other and from the midrib. The natives declare that it is a different kind of coco-nut—by which they certainly mean that it is, in their opinion, a distinct and fixed species. For myself, I am uncertain about this; I am assured that the variety reproduces itself truly from seed, but, on the other hand, the manner of growth is suspiciously like that which, for instance in the Solomon Island plantations, is known to be produced by the attack of a beetle.

Before I went into the Pacific I had never seen—I doubt if I had ever heard of—a coco-nut tree with anything but a straight and simple stem. But in Fiji I have seen trees with branched stems, doubtless as the result of injury. I am able to show you the picture of one which has divided into three (fig. 126), and of another divided into seven (fig. 127).

The ordinarily single stem of the coco-nut is—unlike those of most other tall-growing palms—rarely quite straight; but very occasionally, of course as the result of abnormal conditions, it assumes extraordinarily twisted forms.

The fruit of the coco-nut, at any rate in its adult and transported state, is too well known to need any description here. Here in England it is generally seen deprived of its thick fibrous covering.

The flower-spike, wrapped in its hard woody sheath, starts from the top of the trunk, just where the lower leaves, *i.e.* the oldest, leaves start. The flower-spike is originally erect, or almost so, but when the

small flowers have turned into fruits and these begin to swell to the comparatively enormous size which they eventually attain, the ever-increasing weight forces the spike to bend downward, till the mature bunch of fruit—often weighing much more than a man can conveniently lift—hangs down below the leaves.

It may be as well here to say that there are many varieties of coco-nut, *i.e.* *Cocos nucifera*, under cultivation in different parts of the world, differing from each other very greatly in size and colour. Botanists refuse to recognize any specific differences between these, and they are probably right from their point of view, for all these variations are probably the result of long cultivation—or rather of long and probably partly unintentional selection. But for practical purposes one cannot overlook the difference in size between, say, the huge nut of Rotumah—which even without its husk is as large as an average man's head—and the little “drinking-nut” which is grown in the Friendly Islands for the express purpose of quenching the thirst of the chiefs and nobles. This latter is so small that a section cut from the centre of the nut serves as a very convenient napkin ring.

Where the coco-nut palm—by which I mean all the varieties which can without doubt be included in that useful class—originated, and what has been the history of its distribution, in greater or less abundance, throughout almost all the sea-coasts of the tropics, are matters quite uncertain. It is not known, at least with any certainty, as a wild species anywhere. Probably the most widely accepted story now is that it originated at some point on the western side of Central America. Briefly stated, the reasons for this belief are that by far the greater number of the same genus *Cocos*—over seventy in number—are tropical American; that though the coco-nut is now naturalized practically everywhere on the shores of tropical seas it has almost certainly been longer and more thoroughly established in the islands of the Pacific than elsewhere; that it is next best established in the Indian Ocean, especially in the Maldives and Ceylon; and that though present it appears to be least well and least long on the eastern side of America and in Africa—of all tropical areas. And, lastly, the great ocean currents of the Pacific are just such as would account for the natural distribution of the coco-nut from some point on the west coast of tropical America to the places, as has just been said, where the tree now appears most at home.

It seems to me that there can be little doubt that the coco-nut was originally distributed—at any rate through the Pacific—mainly naturally, *i.e.* by the floating of the large, buoyant, and thoroughly water-proofed nut, with husk on, along the great ocean currents. The poet LONGFELLOW has vividly described another kind of flotsam as

“Ever drifting, drifting, drifting
On the shifting
Currents of the restless main;
Till in sheltered coves and reaches
Of sandy beaches
All have found repose again.”

That well describes the almost world-wide distribution of the innumerable coco-nuts which, from times beyond the memory of man, must have been carried on the shifting currents of the ocean into the most distant parts of the world, many of them soon finding congenial resting and growing places on the sandy coral rocks of tropical seas, but some few floating on further and further till at last a nut or two occasionally reached even to the cold and ungenial European shore, there to be picked up by the wondering inhabitants and esteemed so strange and marvellous that these "nuts of India" were cunningly mounted with gold or silver for use as cups at the most splendid of royal feasts, and later found place in the cabinets of the curious.

The coco-nut is certainly most at home—and is most necessary to the life of the natives—in the islands of the South Seas, in that wonderful group of innumerable islands, mostly very small, which reaches out two-thirds of the way across from the Australian to the American shore, and is right in the track of the great currents and in the teeth of the mighty winds which sweep mainly from east to west across the Pacific Ocean. On to the once bare rocky edges of these islands and atolls (fig. 128), many a coco-nut must have drifted, taken root and grown; and in time countless numbers of these fringed every shore, and crowned every island and islet and outstanding rock (fig. 129). The most characteristic of all these islands are the coral atolls which at some comparatively recent date have been lifted out of the ocean—"strange rings of coral rock rising from the bottom of the sea." Whenever these were raised they must, of course, have been at first bare of vegetation. Even now one occasionally comes across one, the bare rocks of which are not yet softened by any plant life, and more often one comes across others on which as yet hardly anything but the coco-nut and perhaps the screw-pine have yet found foothold.

There is still many an island in the South Seas the natives of which—if indeed there are any permanent inhabitants—have no food supply except fish from the sea and the produce of the coco-nut palm and screw-pine; and it is really on the coco-nut that they are almost solely dependent. At times, and for considerable periods when no rain has fallen to refill the hollows in the rocks, these natives have nothing but the "water" out of the young coco-nuts with which to quench their thirst.

Nor is it only for food and drink that the native is, or was, chiefly dependent on this all-useful palm. He habitually uses the various parts of the tree for all sorts of purposes. If he wants to fence off his fish-ponds he does it with great masses of dead coco-nut leaves weighted down with stones (Fanning Island and in some parts of Fiji). He often builds his house of coco-nut leaves. If he wants to dance he makes his special dress for that purpose of the same material. Of it he makes, or used to make, mat sails for his boats. He makes all the string or rope which he needs for innumerable purposes from the fibre of the husk of the nut; for instance, he fastens together even



FIG. 124.—COCO-NUT PALMS AT ONGTONG, JAVA.



FIG. 125.—A PECULIAR FORM OF COCO-NUT PALM.



FIG. 126.—MANY-HEADED COCO-NUT PALM.



[Photo: N. Chalmers.]

FIG. 127.—MANY-HEADED COCO-NUT PALM, SUVA.

[To face p. 329.]

the most elaborate of his houses with this string, and uses not a single nail in the whole edifice. If he wants to make a ceremonial gift it cannot take more magnificent form than a great ball of the finest coco-nut string.

I have hitherto spoken of the uses made of coco-nut palms by Pacific islanders; and time fails to tell much of other uses made in other parts of the world. But there are just two points in connexion with Ceylon which I should like to mention.

There one of the chief uses, by natives, of the coco-nut palm is the extraction of toddy from the young flower-spikes, which to-day, when fermented, becomes arrack.

In Ceylon the more artistic native turns the young coco-nut leaf to marvellous decorative use. At the time of the coronation of King Edward the natives built a large and really beautiful pavilion practically entirely of these young leaves (fig. 130).

To return to the uses made of the coco-nut in the Pacific islands: hitherto I have confined myself chiefly to the uses by natives and for their own purposes, but even of such uses have hitherto failed to mention one of the most important.

Long before the advent of Europeans to those parts oil was doubtless extracted by the natives from the nuts; and this oil, generally after being heavily scented with sandal-wood, was used by them for anointing their hair and bodies. When Europeans first arrived in the islands they came to get sandal-wood and any other marketable merchandise which they could lay hands on. They had to content themselves for the most part with pearl shell, *bêche-de-mer*, and other raw produce of the sea. But gradually it was found that there was one thing which the natives produced primarily for their own use, but which could be profitably exported; and this was coco-nut oil. The captains of the whalers and other ships which called at the islands in early times almost always tried to get a few casks of coco-nut oil from the native chiefs. A little later the Wesleyan missionaries established themselves in the islands, and they soon found that the readiest means to collect money, or rather money's worth, from the converted natives, for the support of the mission, was in the form of coco-nut oil. Hence a regular practice of collecting this oil for other than their own uses was started by the natives.

Still later, when Europeans had more firmly established themselves in the islands, it was recognized that the extracted oil in casks or barrels was a difficult thing to handle. The new plan of cutting out the "meat" of the coco-nut, drying it, and exporting it in the form of "copra"—the oil from which was afterwards expressed by suitable mills—was adopted. Thus was started the trade in copra which has now reached such huge dimensions.

TROPICAL AND SUBTROPICAL FRUITS IN CALIFORNIA.

By F. W. POPENOE, F.R.H.S., ALTADENA, CALIFORNIA, U.S.A.

CALIFORNIA has been known for many years for its oranges and lemons, its prunes and apricots, and many other fruits which it grows on an extensive scale. The last quarter of a century, however, has witnessed a great increase of interest in the cultivation of other exotic fruits, especially those of a tropical or subtropical nature. Several of comparatively recent introduction are already taking a position among the commercial products of the State ; others, while perhaps marketed in a small way, are grown more for the interest they possess, and to increase the variety of fruits placed upon the home table.

One of the most remarkable features of California is its wide diversity of climatic conditions, embracing comparatively humid, frost-free localities near the sea-coast, arid but frost-free locations in the foothill regions several miles back from the ocean, and interior valleys whose climatic conditions are little different from those of the Sahara, as well as the cooler portions of the State where the temperate fruits are grown to perfection, and mountain slopes where Conifers flourish up to the point of perpetual snow. Obviously, such a range permits the cultivation of nearly all fruits except the most delicate of the equatorial belt, the absence of uniformly high temperatures throughout the year prohibiting the successful cultivation of such species as the durian, mangosteen, and rambutan. And while our horticulturists have been somewhat slow in following up their advantage, they are at last awakening to a realization of their strategic position, and pushing forward in all directions.

Every quarter of the globe has been laid under contribution to furnish its most interesting and valuable fruits to California. Many of these introductions have not yet passed beyond the experimental stage, having been too recently imported to have produced fruit yet or to have fully proved their adaptability to our climate and soil, but they, nevertheless, show promise of eventually becoming valuable additions to our economic flora. The following species, for many of which we are indebted to Dr. F. Franceschi of Santa Barbara, whose twenty years' work of introduction and acclimatization has added many beautiful and valuable plants to Californian gardens, are some of the most interesting of this class :

Achras Sapota Linn., *Antidesma Bunius* Spreng., *Britoa acida* Berg, *Byrsonima crassifolia* H. B. & K., *Calodendrum capensis* Thunb., *Castanospermum australe* A. Cunn. & Fraser, *Clausena Wampi* Oliver, *Coccoloba caracasana* Meissn., *Crataegus mexicana* Moc. & Sesse, *Cupania sapida* Voigt (properly *Blighia sapida* Kön.), *Eugenia alba*

Roxb. (properly *E. javanica* Lam.), *E. brasiliensis* Lam., *E. cauliflora* Berg, *E. costaricensis* Berg, *E. edulis* Vell., *E. littoralis* Planch., *E. Luma* Berg (properly *E. apiculata* DC.), *E. Mato* Griseb., *E. pungens* Berg, *E. pyriformis* Cambess., *E. Uvalha* Cambess., *Ficus Pseudo-Carica* Miq., *Flacourtia Ramontchi* L'Hérit., *Greigia sphacelata* Regel, *Lucuma mammosa* Gaertn., *Malpighia mexicana* A. Juss., *Melicocca bijuga* Linn., *Myrtus Arayan* H. B. & K., *Nephelium Lit-chi* Cambess., *N. Longana* Cambess., *Passiflora ligularis* A. Juss., *Psidium cuneifolium* Tenore, *P. Friedrichsthalianum* Niedenzu, *P. laurifolium* Berg, *P. littorale* Raddi, *P. montanum* Sw., *Rollinia emarginata* Schlecht., *R. orthopetala* A. DC., *Strychnos spinosa* Lam., *Vangueria edulis* Vahl (properly *V. madagascariensis* J. F. Gmel.), *V. infausta* Burch., *Vitellaria multiflora* Radlk. (properly *Lucuma multiflora* A. DC.), *Xylosma Salzmanni* Eichl.

Leaving these out of consideration, the following list describes the actual situation with regard to those which have become so well established as to be offered by the trade :—

THE AVOCADO (*Persea gratissima* Gaertn.).

During the last few years the Avocado has attracted so much attention in California that it is rapidly assuming a position of importance among commercial fruits. Although introduced about 1870, it was scarcely known until after 1900, and only seedlings were grown until four years ago. Since it does not come true to variety when grown from seed, it was recognized that cultivation on a commercial scale would only be made possible through vegetative propagation. Budded trees are now being produced, and many have been planted.

The exact area in which the Avocado can be grown has not yet been determined, but it has been found to do well in the Citrus belt and coastal regions of the southern part of the State. Since its success elsewhere depends largely upon obtaining hardier and more drought-resistant types, a definite search has been made for such types in Mexico, with the result that varieties have been secured that will, without doubt, greatly extend the area in which the fruit can be profitably grown.

Most of the trees now in bearing are of Mexican or Guatemalan origin. The type from Guatemala (fig. 131) appears to be the most desirable for commercial purposes, on account of its thick, woody skin, which permits the fruit to be shipped to distant markets. The smaller, thin-skinned type from Mexico (fig. 133), considered a distinct species, *P. drymifolia* Cham. & Schlecht., by some botanists, is not so valuable commercially, but is a favourite for home use. Of both these types there are numerous named varieties, some of the most prominent being 'Taft,' 'Lyon,' 'Murrieta,' and 'Chappelow.'

Propagation by shield budding is somewhat more difficult than with Citrus fruits, probably because it is not, as yet, so well understood, but several nurserymen are producing budded trees in large numbers. Grafting, when done under glass, is also successful and is

practised to a limited extent. Seedling stocks are ready for budding at the age of six or seven months, when grown under favourable conditions, and are worked in spring or summer.

Avocados command fancy prices in the markets, single fruits fetching as high as \$1.25 in the winter season, although the average price for a good specimen, about a pound in weight, is 50 or 60 cents. The two types bear at different times of the year, and this, with the variation in season of the different varieties, permits the fruit to be in market for about ten out of the twelve months.

THE CHERIMOYA (*Anona Cherimolia* Mill.).

Although introduced at about the same time as the Avocado, the Cherimoya (figs. 132, 135) has not yet become commercially popular. This can only be attributed to the fact that propagation by seed has resulted in a large majority of the trees being inferior or worthless. Several small seedling orchards have been planted and later grubbed out because the trees did not produce enough fruit to make their culture profitable. Budding is now being practised, and prolific and otherwise desirable varieties are being planted. The cool climate of the coastal regions of southern California seems to be especially suited to this fruit.

As yet only two named varieties are known; of one, the 'Golden Russet,' a small plantation of budded trees is now in bearing. There is no disputing the fact that the Cherimoya, in its finer varieties, is one of the most delicious of all fruits, consequently the future of Cherimoya culture, now that propagation by budding has placed it on a sound basis, looks very bright.

THE DATE (*Phoenix dactylifera* Linn.).

Experiments carried out by the Department of Agriculture and by various private growers have demonstrated that the date palm is admirably adapted to the Imperial and Coachella valleys, in the southern end of the State, where climatic conditions are practically those of the Sahara. Palms have been in bearing for some years, and through the importation of offshoots and planting of seedlings an industry is being rapidly developed. Nearly 25,000 offshoots have been imported, about 9000 having come from the Persian Gulf region and the remainder from North Africa. Varieties from practically all the principal date-growing regions of the world have been planted experimentally, and an accurate idea gained as to their adaptability. The 'Manakhîr' from Tunis, 'Deglet Nur' from Algeria (fig. 136), and 'Maktum,' 'Khustawi,' and 'Khadrawi' from Mesopotamia have proved to be among the best.

THE MANGO (*Mangifera indica* Linn.).

The progress of the Mango (fig. 137) in this State has been retarded by the planting of worthless seedlings, and by neglect of many of the trees. In a few localities fruits of good size and flavour have been

produced, demonstrating, at least, that Mango culture is not an impossibility here. Locations in the foothill regions, which experience a high degree of heat throughout the summer, have proved to be best suited to the Mango, the climate along the coast being too cool during the summer to ripen the fruit perfectly.

The Department of Agriculture is now conducting co-operative experiments in several localities thought to be suited to Mango culture, about forty varieties being on trial. Many of these were introduced from Saharanpur, Bombay, and other sections of India famous for their Mangos, and are the best Indian varieties.

THE LOQUAT (*Eriobotrya japonica* Lindl.).

The Loquat has been grown in this State for forty years, with considerable attention recently given to its improvement. Seven or eight named varieties are now offered by the trade. The climate in some parts of the State seems particularly suited to it, and the fruit develops to large size.

Loquat culture is most prominent in Orange county, the largest single plantation being about forty acres in extent. Early in the season the fruit sells at 10 to 15 cents a pound, and many tons are marketed each year.

Propagation is by budding, seedling Loquats being generally used as stocks. When budded on quince the trees are dwarfed.

The best varieties of local origin are 'Advance,' 'Premier,' and 'Champagne.' A variety introduced from Japan some years ago under the name of 'Giant,' but seemingly synonymous with 'Tanaka,' is later in ripening than the local varieties, but of large size and excellent quality.

THE GUAVAS (genus *Psidium*).

The only species at all common is *P. Cattleianum* Sabine, which goes under the name of Strawberry Guava, and is found in backyards and gardens throughout the southern part of the State. The fruit is a favourite for jelly-making, and is widely sold in the markets. A yellow-fruited form of this species, *P. lucidum* of horticulture, is much less common, but fully as valuable.

P. Guajava Linn., of which there are here, as elsewhere, a number of more or less distinct varieties, is not infrequently seen, and is hardy enough to be successfully grown in many localities. It is difficult to explain why it has not become more popular, since the fruit is preferable for jelly-making to that of the Strawberry Guava.

Several other species are occasionally seen. One somewhat similar in general appearance to *P. Cattleianum* was introduced from Florida under the name of *P. Araça* Raddi, and is likely to become popular, as the fruit is of good size and flavour. Another species introduced from Florida is listed as *P. guineense* Sw., but it is certainly not this species, and is so similar in every characteristic to *P. Guajava* that it can probably be referred to a horticultural form of that species.

THE WHITE SAPOTE (*Casimiroa edulis* La Llave).

This was the first tropical fruit planted in California, having been introduced by the early Mexican settlers (fig. 138). It has never become very popular, and is not commonly cultivated, the greatest drawback being that seedling trees require nine or ten years to come into bearing, and are even then very uncertain as to the size and quality of fruit they will produce. Attempts at asexual propagation are now being made, in order to perpetuate choice varieties originated as chance seedlings. So far only seedlings have fruited, and it is not known that any of their fruit has ever been placed on the market.

THE FEIJOA, OR PINEAPPLE GUAVA (*Feijoa Sellowiana* Berg).

Although recently introduced, the Feijoa (fig. 134) is already widely planted and is becoming more popular every year. Its hardiness permits it to be grown almost anywhere in California, although it does not seem to thrive in the extremely hot interior valleys.

Most of the plants now growing in the State have been propagated from seed, but to perpetuate choice forms it is necessary to resort to vegetative propagation. Cuttings are not difficult to root, and grafting is successful; layering is the easiest method, but is too slow ever to be popular.

Three named varieties have been established, of which the best is probably the 'André,' the plants grown here having been propagated from the specimen in the garden of the late Edouard André, at Golfe-Juan, on the Riviera.

THE ROSE APPLE (*Eugenia Jambos* Linn.).

This species has proved to be quite hardy in southern California, but is planted more for its ornamental value than for its fruit. There is much difference among the plants, some producing larger, more highly coloured and highly perfumed fruits than others, perhaps due in some measure, but not entirely, to the care bestowed upon them.

E. uniflora Linn. (*E. Michellii* Lam.), another member of the genus of economic value, is not up to the present time a success as a fruiting plant. Although it is apparently at home in this climate, the plants produce too sparingly to be of any value. The same appears to be true of *E. Jambolana* Lam.

THE JUJUBE (*Zizyphus sativa* Gaertn.).

For the interior arid valleys the Jujube is proving of value, and, through the introduction of the choice Asiatic forms recently secured by the Department of Agriculture, it seems likely to become of real importance. Practically all those which have been grown up to the present time are inferior seedlings.

THE PASSION FRUIT (*Passiflora edulis* Sims).

The abundance of better fruits with which Californians are supplied has prevented the passion fruit from becoming popular. It is hardy, and not infrequently seen in gardens, but the fruit is rarely used.

THE NATAL PLUM (*Carissa grandiflora* A. DC.).

This shrub bears too sparsely to make it of economic importance, but its ornamental value has stimulated planting to such an extent that it is occasionally seen in gardens and collections of exotics. There seems to be considerable variation among the different plants in regard to productiveness as well as size of fruit, and taking advantage of this it should be possible to secure, through asexual propagation, varieties that will be worthy of general cultivation.

THE POMEGRANATE (*Punica Granatum* Linn.).

The Pomegranate is produced commercially in a small way, the demand for the fruit being limited. The shrub succeeds best, and is most commonly grown, in the interior valleys. The inferiority of the varieties cultivated in the State has led to an attempt to secure superior ones; among those which have been introduced the variety 'Wonderful' has proved to be choice, and is now offered by the trade.

THE JAPANESE PERSIMMON (*Diospyros Kaki* Linn.).

This fruit is becoming quite popular, and is proving correspondingly remunerative to the growers. The varieties most extensively grown are 'Tane Nashi' and 'Hachiya.' From one grove of six acres over 15 tons of fruit were picked last season, which sold at 10 to 12 cents a pound.

THE PINEAPPLE (*Ananas sativus* Schult.).

At several different times attempts have been made to grow pineapples commercially in southern California, but these have always resulted unsuccessfully, since an excessive amount of care and expense was required in the production of the fruit, and it could not be sold at a profitable figure in competition with the imported product.

Pineapples require more heat than is found on the sea-coast to develop to large size and perfect maturity, consequently they are more successfully grown in the foothill regions some miles back from the ocean. 'Red Spanish' and 'Smooth Cayenne' are about the only varieties cultivated, and these are rare.

THE TREE TOMATO (*Cyphomandra betacea* Sendt.).

This plant is occasionally seen in gardens, but the fruit is usually allowed to fall to the ground and go to waste. Its easy culture has made it more widely planted than would otherwise have been the case, but as a fruit it is in no likelihood of becoming very popular.

THE KEI APPLE (*Aberia caffra* Harv. & Sond.).

As grown in California this is a fruit of little value, and in addition bears very sparsely except in rare instances. It has proved to be quite hardy, and seems to be of considerable value as a hedge plant, but its cultivation is not being extended very rapidly.

THE PAPAYA (*Carica Papaya* Linn.).

The Papaya is one of the tropical fruits which Californians seem most anxious to grow, and many seedlings are annually planted. Most of these succumb during the cold rains of winter, but in favoured locations, with well-drained soil, the plants sometimes reach maturity and bear fruit. Old plants exist at Hollywood which bear regularly, but the summers are not hot enough in this locality to mature the fruit perfectly. Further inland, in locations practically free from frost, better success is attained. The whole subject, however, is in an experimental stage as yet.

THE KAFFIR PLUM (*Harpephyllum caffrum* Bern. ex Krauss).

This South African tree, introduced about eight years ago, is chiefly valuable as an ornament. Although it has fruited in several localities, it does not produce regularly or abundantly, and the fruit itself is of little value. It seems hardy enough for ordinary locations, and has been planted to a small extent as a street tree.

THE CERIMAN (*Monstera deliciosa* Liebm.).

Fairly common as an ornamental plant in ferneries and pergolas, its fruit does not ordinarily ripen sufficiently to be eatable, although it is freely produced and attains good size.

THE BANANA (*Musa sapientum* Linn.).

In favoured locations in southern California good bananas have been produced, one grower at Santa Barbara even going so far as to cultivate a small commercial plantation for several years. The banana is one of the commonest ornamental plants to be seen in dooryards and gardens but in ordinary locations the fruit does not ripen perfectly and is of no value. In addition, the varieties cultivated are practically all inferior ones.

THE CHINESE RAISIN (*Hovenia dulcis* Thunb.).

Although usually listed as a fruit, this species as grown in California has no economic value whatever, and, although offered by several nurserymen, is rarely planted.

THE QUEENSLAND NUT (*Macadamia ternifolia* F. v. M.).

The drought-resisting qualities of this tree make it of value for semi-arid regions, while its ornamental appearance commends it for culture in every garden. While very few trees are yet in bearing in the State, several thousand young plants have been disseminated by the nurserymen within the last few years, and the tree promises to become popular, not only for the home garden or orchard, but commercially as well.



FIG. 128.—SURF BREAKING ON THE WEATHER SIDE OF FANNING ISLAND.



FIG. 129.—COCO-NUTS ABOVE STRAND, NEAR ENGLISH HARBOUR, FANNING ISLAND.

[To face p. 336.]



FIG. 130.—KANDY EXHIBITION, JUNE 1902.



FIG. 131.—AVOCADO OF THE GUATEMALA TYPE.

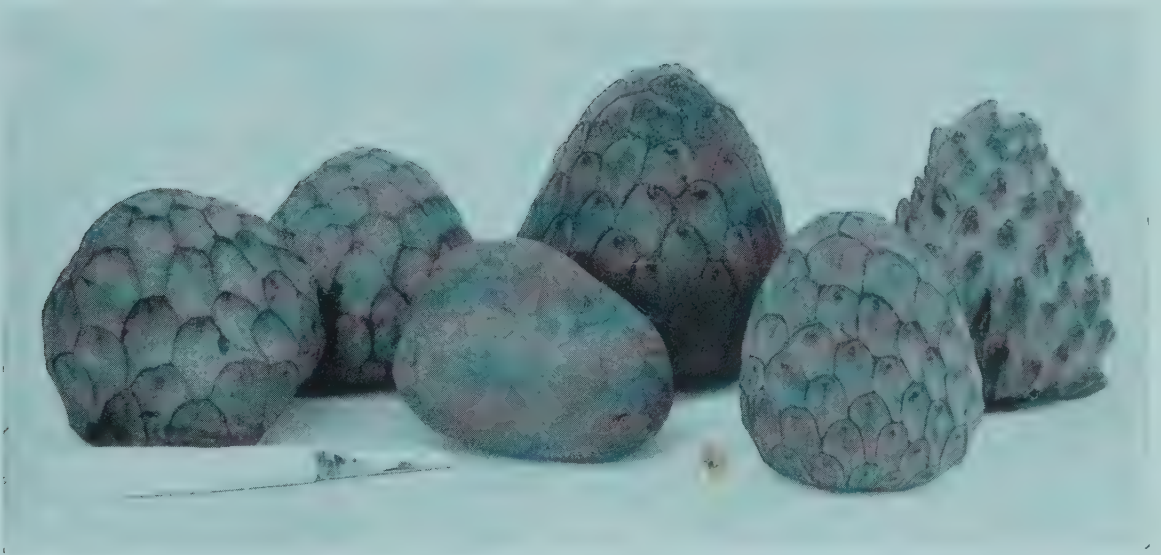


FIG. 132.—CHERIMOYAS OF DIFFERENT TYPES GROWN IN SOUTHERN CALIFORNIA.



FIG. 133.—FRUITS AND FOLIAGE OF THE MEXICAN TYPE OF AVOCADO.



FIG. 134.—FRUITS AND FOLIAGE OF FEIJOA SELLOWIANA.



FIG. 135.—CHERIMOYA TREE, FIFTEEN YEARS OLD, AT HOLLYWOOD, CALIFORNIA.



FIG. 136.—PLANTATION OF "DEGLET NUR" DATES AT HEBER, CALIFORNIA.



FIG. 137.—YOUNG MANGO TREE IN BEARING AT LOS ANGELES, CALIFORNIA.



FIG. 138.—A WHITE SAPOTE AT SANTA BARBARA, PROBABLY THE FIRST TROPICAL TREE PLANTED IN CALIFORNIA.

[To face p. 337.

THE CAROB (*Ceratonia siliqua* Linn.).

The Carob is grown here almost exclusively as an ornamental tree, the inferiority of the local varieties, as well as the abundance of better fruits, preventing it from becoming of any economic value. While not common, it is rather frequently seen in gardens, and is sometimes used as a street tree.

THE MELON SHRUB (*Solanum muricatum* Ait.).

This is one of those fruits whose chief recommendation is the ease of its culture. Some profess a liking for the fruit, but as a general rule the plant is grown as a curiosity and the fruit is allowed to rot on the ground. It is rarely seen in Californian gardens.

THE EVOLUTION OF PLANTS, AND THE DIRECTIVITY OF LIFE, AS SHOWN BY VEGETATIVE STRUCTURES.

By Rev. Professor G. HENSLOW, M.A., F.L.S., V.M.H.

[Read June 17, 1913; Sir F. W. MOORE, F.L.S., in the Chair.]

Introduction.—My last lecture* was on “The Origin of Life—Undiscoverable.” We can only deal with life so far as we know it. I endeavoured to show that all theories of the origin of life were inadequate; and one reason was because they left out of consideration the fact that life is something over and above all kinds of physical force, and that, in the process of making vegetable and animal structures, life guides or directs inanimate forces so that they compel the similarly inanimate matter to build up cells, tissues, and organs in a purposeful manner.

We group the various organs of plants under two heads, the Vegetative and Reproductive (proper). The former embrace the roots, stems and branches, leaves and stipules. The latter are the flowers and fruits. The floral organs are the bracts, sepals (calyx), petals (corolla), stamens, and carpels (pistil). Each and all of these organs are variable, *i.e.* can change their forms provided the necessary external conditions of life are present.

As long as a plant lives generation after generation under precisely the same conditions, no change is likely to occur; but when seeds get transported to some markedly different locality, then, as they germinate, they begin (if it be necessary) to change their structures in *response* to the changed environment. The change may be slight—as in a greater or lesser degree of hairiness—or profound, especially in the internal structures, as in changing from a land to a submerged life, and *vice versa* (as has occurred in the water-crowfoot). The “response” may bring about no “benefit” to the plant, as in the case of drought, which prevents branches and leaves being fully formed, so that they get reduced to spines, a common feature of tropical “thorn forests,” savannahs, deserts, heaths, &c. On the other hand, the changes generally involve *uses*, without which the plant could not live; as in developing a cuticle and breathing stomata, on what had been submerged leaves without either structure. Hence we may say generally that “purposeful adaptations” are the result of changed conditions in the environment, such being ultimately the effect of the “Directivity of Life.”

I now propose giving illustrations of such changes in each of the several organs of plants.

Roots.—Roots have three principal functions, viz. to supply water and dissolved salts; they may act as reservoirs of water and

* See p. 39.

plant food ; and they act as supports to the aerial part of the plant. The forms of roots, more or less characteristic of species and varieties, are not very numerous ; the commonest is long and cylindrical, such as, *e.g.*, the wild form of the carrot, turnip, radish, and parsnip, or generally the tap or primary root of a dicotyledonous embryo. Under cultivation in a wet and rich soil, it has varied to a conical form in the carrot and parsnip ; into a spindle-shaped and globular one in the radish and beet and in the rape and turnip respectively.* These forms raised under cultivation are hereditary in ordinary garden soils ; but they at once revert to the wild form if they be grown in a fine, sandy soil. The globular type was produced by sowing the seed in a stiff soil, which presumably prevents the downward penetration of the tap-root.

The cause of the change of form is the new conditions of life provided in cultivation. The plant is stimulated by much nourishment to make larger leaves ; these then do more work, making more starch and sugar than is required for annual growth ; hence it has to be stored up, so the root enlarges to receive it. This "vegetative" function being prolonged delays the process of reproduction by flowers and seeds until it is too late in the season. The plant thus becomes a biennial ; being provided with plenty of water, the leaves become nearly or quite hairless. These garden forms are obviously thus the result of response to the changed conditions of life.

Peculiar forms with changed internal cellular structures are found in many herbs and trees growing in marshy districts. Some trees, as the deciduous cypress (*Taxodium distichum*), not infrequently cultivated, have roots more or less hollow, which rise above the swamp, erect, or as "knees," whereby the roots get aerated. One of these trees near the Thames, in the gardens of Sion House, has numerous "pneumatophores" (air-carriers) ; but a fine tree in the garden of the Grand Hotel, Lyndhurst, in the dry sandy soil of the New Forest, has none at all.

Our little marsh-samphire (*Salicornia herbacea*), common in salt-marshes, has its roots clothed with a spongy coating which provides the plant with air in a similar way.

On the other hand, some plants† growing in the deserts have knotty swellings on the roots which store up water against the dry season.

Clasping roots have been acquired to enable many plants of various families to climb up walls, tree-trunks, &c., as our own ivy, members of the Aroid family in tropical rain forests, epiphytic orchids, and many others, showing the general property of adapting the roots to other purposes than that of providing water and salts as in all ordinary plants.

Tap-roots are always arrested in aquatic dicotyledons and all monocotyledons, which have undoubtedly descended from the former. Consequently their roots must arise from the base of the stem in ascending series from the nodes ; the stem, increasing in size, becomes

* The rape and turnip are varieties of the same species, *Brassica campestris*.

† *E.g.* species of *Erodium*, or Stork's-bill, in the desert near Cairo.

conical with the *apex* resting in the earth. The herb or tree (*e.g.* *Pandanus* and Palms) is then supported by stilt- or prop-roots. They are usually cylindrical; but in some tropical trees, having a very long trunk and a heavy mass of foliage at the top, as has the mahogany, or in short trees similarly with great weight, the roots form flat buttresses. Such are imitated in a small way by engineers, who put "gussets" at the base of iron pillars, to strengthen them. Many are like "flying buttresses."

All the cases here mentioned, whatever be their uses, are the results of adaptation to the conditions of life. They are, moreover, characteristic of the species, genus, and, not infrequently, of the order to which they belong.

Stems.—The external forms of stems vary very much, but they are always the consequence of responding to the conditions of life, as anyone may observe for himself. Thus short, thick trunks with a heavy mass of foliage are characteristic of, say, the horse-chestnut and oaks; while tall, straight stems are seen in pines. The former type indicates a greater freedom of growth, while the latter, by growing thickly, are "drawn." These characteristics have become hereditary, but special varietal forms, as the "fastigate" and "weeping," may be only feebly hereditary. Thus seedlings of the weeping ash show a tendency at first to "weep," but become erect afterwards, as experiments have shown. The weeping willow retains this habit by water, but several planted in the dry St. John's Wood Cemetery, London, exhibited no such tendency.

The "weeping" habit appears thus to be attributable to moisture in the soil or air; for the Deodar Cedar, when growing in its native home on the Himalaya Mountains, resembles the Cedar of Lebanon, but in England the habit has become drooping, though the Cedar of Lebanon has retained the stiff character of the branches.

Some trees of warm climates have enlarged bottle-shaped trunks. The wood-fibres have delicate cell-walls, hence called "cork-wood" (*Ochroma lagopus*), for their function is to store water.

Experiments have shown that ordinary woody stems grown in very dry air, in very wet air, and under normal conditions differ very appreciably in the comparative amounts of wood, pith, and cortex, the wood being greatest in the driest conditions and the cellular tissues greatest in the moist ones.

The comparative uselessness of the wood of poplars and willows is due to their responsive growth in a watery soil.

The general necessity of wood in trees is of course to support their own weight: in other words, to resist the everlasting pull of gravity downwards. This has become hereditary, because seedlings of trees and shrubs develop a strong cylinder of wood at once when only two or three inches in height—a quite unnecessary proceeding, as may be seen by comparing it with any herbaceous plant, say the flower-stalk of a cowslip, in which only a discontinuous circle of vascular bundles is formed, being quite sufficient for purposes of support.

In a previous lecture on the senses of plants I showed how woody stems respond to strain tensions, &c., and build up mechanical structures to meet them. All such can become hereditary.

Underground stems assume various forms, as tubers, corms, rhizomes, creeping stems, &c. They are all adaptations for either storing water, starch or other food supplies, or else for propagation ; generally both purposes are combined.

As a rule the special forms are constant in each species of plant respectively, but now and then nature changes them or does not develop them when the place happens to be very moist. Such is the case with the grass, *Poa bulbosa*, which has swollen internodes for holding water ; similarly *Ranunculus bulbosus* fails to produce the characteristic "corm" when it grows in wet and peaty soil.* The leek is naturally a bulbous plant, as in the dry limestone soil of Malta, where it is wild, but under cultivation the bulb is not retained, though it is so in other kinds of onion (genus *Allium*). It occasionally will reproduce the bulb. Bulbs are very characteristic of certain families of monocotyledons, as the Daffodil, the Iris, and Lily families. The reason appears to be that, as *all* monocotyledonous plants are descended from aquatic dicotyledons, when adapting themselves to a land situation they adopted water-storage methods to enable them to live through the dry seasons.

Long, subterranean, creeping stems of species of grasses and sedges occur in sand-dunes. If a shoot of hop or mint, &c., be buried, it will continue to grow for some distance and then reappear above ground. The portion buried will be found to have taken on all the characters of a rhizome.

Similarly epiphytic orchids, which attach themselves to branches of trees in tropical forests, by means of clasping or adhesive roots, though the forest may be always wet below, the epiphytic orchids are dry near to the tree-tops, so they induce their internodes to swell into "pseudo-bulbs" having a very tough rind ; but the interior consists of a mass of delicate cells filled with water.

Woody-stemmed shrublets of the deserts, as near Cairo, fill their cortex, or pith, &c., with water, so as to withstand the dry and hot summer months.

A result of response is often "degeneracy"—that is to say, organs no longer required are supplanted by others ; the former then cease to be formed or are only feebly represented. Thus aquatic stems need no "wood," as the water supports them, the vascular bundles degenerate, the formative "cambium" nearly or quite disappears. Such is the case with all aquatic and all monocotyledonous plants. In the latter the wood does not form close-fitting concentric cylinders as in all timber trees, as there is no cambium layer wherewith to form them. Hence palms cannot increase beyond a certain amount, radially. The power to do so is lost originally by response to an aquatic life.

* A peaty field by Poole harbour abounds with it ; but, instead of flowering in May, it does not do so till August and September.

Another acquired habit is that of climbing by means of the stem. It has often been observed that some genera of plants may have non-climbing species in the open, but climbing ones in shaded places, the climbing habit having been acquired by the seedling being "drawn" when germinating in a dark forest or wood. Then the elongated stem, by circumnutating, cannot help coiling up some neighbouring stem. If a bean or some non-climber with a slender stem, as a periwinkle, be grown in total darkness, and a fine stick be placed close to it, as the stem elongates it will coil spirally around it. This habit can become hereditary. With regard to tendrils, they may be metamorphosed leaves, as in peas, or flowering branches, as in the vine and Passion flower. In the Virginia creeper there are superadded adhesive pads, which are only developed on contact with the wall, to which the hooked tips of the branches of the tendril become attached. In this species of *Ampelopsis* they are never formed previously to contact; they *are* in the Japanese species, but they are not effective till *after* contact.

A member of the Cucumber family (*Trichosanthes*), only known to climb by tendrils which clasp, happened to press its tendrils against the wall of a frame. It at once began to form pads, thus proving its capacity to direct adaptation to a new condition in a new way.

An ordinary climber may cease to climb if it have nothing to climb up, and assume a creeping habit, as our common bindweed, which will frequently clothe a bank, just as *Convolvulus Soldanella* spreads over the sand of our sea-shores, but never climbs like the other species of that genus.

Leaves.—We are all familiar with the diversity of the forms of leaves; but they are the result of adaptations to the conditions of life. We may roughly divide leaf-blades into broad and narrow. The former are such as can be spread out, so as to be at right angles to incident light; the narrow ones, as of grass, are the result of growing thickly together, so that they get pretty equally illuminated on both sides, the anatomical structures corresponding, whereas in horizontal leaves the upper and under sides are quite different. Some few plants twist their leaf-stalks—apparently for strength—when the characters of the two sides now become reversed.

Leaves growing in rather deep water are sword- or grass-like, as those of the Arrow-head. This is due to light falling vertically upon them as on grass in a meadow, as they grow erect under water.

It is not until the blades can float or rise out of it that they become broad, as in pondweeds and the Arrow-head. The complete identity of form and anatomy between such aquatic and land monocotyledons with those of aquatic dicotyledons proves the descent of the former from the latter, the entire structure being adaptation to an aquatic life, though in terrestrial monocotyledons there have been readaptations to the new conditions, without their losing the older aquatic structures to some extent.

Very rapid changes in adaptation are easily seen in the water-

crowfoot. The submerged leaves are divided up into thread-like segments. This is the result of response to the water, but if the seed be sown in a garden the plants grow to maturity, retaining the aquatic form, but adopting the anatomical structure for an aerial existence.

The preceding are but a few typical illustrations of response to changed conditions of life. It is not too much to say that every structure, every cell, is really formed with its own definite purpose, carried out by the act of response, under the Directivity of Life.

The blades can become degenerate, as in leaf-scales on underground stems, but are useful in bulbs, as storage-organs.

Similarly, they are more or less useless as small bracts, but can acquire uses, as when they are brightly coloured or are subfoliaceous. But we are here passing on to the reproductive organs, which will be the subject of the next lecture.

TUBEROUS BEGONIAS.

By CHAS. F. LANGDON, F.R.H.S.

[Read Aug. 26, 1913; Mr. W. A. BILNEY, J.P., in the Chair.]

THE early history of the tuberous Begonia has been so fully and so well dealt with by Sir HARRY VEITCH and the late Mr. JOHN LAING at the Begonia Conference held at Chiswick in 1892, and recorded in the R.H.S. JOURNAL vol. xv., that it will not be necessary to dwell upon it, and as my first acquaintance with these plants did not commence until the year 1885, and then with only a limited collection, I cannot add anything to the remarks then made by the illustrious horticulturists before-mentioned. I should like, however, to repeat the opening remarks of Sir H. VEITCH. He says: "In the whole range of subjects which horticulturists have taken in hand with a view of effecting their improvement and their better adaptation for decorative purposes, there is not one, I think, which stands forth more prominently at the present time than the Begonia." These remarks are as true to-day as they were in 1892; the twenty years that have intervened have only served to accentuate their truth, for great as was the transformation effected by those early hybridists, I think that all will agree that the advances made since have been equally great.

My experience with Begonias dates from the year 1885. Since then I have spent almost the whole of my time in cross-fertilizing and raising them, the first seventeen years with the Rev. EDWIN LASCELLES, of Newton-St.-Loe, and since 1901 as partner in the firm of Messrs. BLACKMORE and LANGDON.

It was the year after I had taken up the duties of gardener at Newton-St.-Loe that Messrs. J. LAING sent out their Royal set of single Begonias, and being already in possession of a small collection, including such varieties as 'Vesuvius,' 'Acme,' and others, Mr. LASCELLES, who was a most enthusiastic amateur, procured the new set and thus possessed a quite up-to-date collection of single varieties.

The following year, 1887, Messrs. LAING sent out their Jubilee set of doubles, conspicuous among them being 'Mrs. A. Adcock,' *alba fimbriata*, 'Prince of Wales' and 'Lady Lennox.' These created quite a sensation. The set included practically all the colours then known, and with a number of varieties of Continental origin which Mr. LASCELLES procured, among them being 'Mme. Arnoult,' 'Gabriel Legros,' 'Clémence Denizart,' 'Mme. Comesse,' 'Mme. Crousse,' and 'Mme. de Dumast,' we had ample material to commence work at cross-fertilization.

Having been fairly successful with a batch of about a thousand

single seedlings, we were ambitious to raise some doubles and began intercrossing the Continental varieties and those of English origin. Our first efforts were very successful, and we obtained about half a dozen varieties that we considered to be distinct advances on the other varieties of the same colours in our possession.

Our enthusiasm in the work being now thoroughly kindled, Mr. LASCELLES procured all the new varieties likely to be of any use either at home or on the Continent. Messrs. CANNELL had at this time commenced sending out a batch of new varieties annually, and these we found to possess characteristics differing very widely from those of Messrs. LAING and the Continental varieties, suggesting to us the possibility that a different group of plants was being used as parents. Messrs. CANNELL'S varieties possessed a stiff habit, round thick leaves and strong flower stems, one of the best examples being the 'Hon. Mrs. Plunkett,' the growth and habit partaking rather of the character of *Begonia rosaeiflora* and *B. Veitchii*. The varieties sent out by Messrs. LAING, on the contrary, were of a much more drooping habit and with long pointed leaves, showing that *B. boliviensis* had been the dominant factor in their origin. Others of Messrs. LAING'S hybrids had evidently been obtained from *B. Davisii*, a good example being the 'Marquis of Stafford,' a very valuable variety for bedding on account of its neat upright habit and bright crimson flowers, borne well above the foliage.

The advantage of having the best examples from three sources, viz. Messrs. LAING, Messrs. CANNELL, and from the Continent, will be apparent when we consider that the first essential in cross-fertilization is to possess a number of varieties, each with some desirable character, but all obtained from more or less distinct sources. This has doubtless contributed largely to the measure of success which I have obtained in the improvement of the Begonia. As my experience points to the fact that inbreeding is bad, and should be avoided as much as possible, I have depended almost entirely on first crosses, and have not worked at all on what are known as Mendelian lines.

I have always kept in view, when crossing, the desirability of obtaining two varieties whose colours and habit of growth were somewhat similar, but as far removed as possible in relationship from one another. This necessitates keeping a pedigree book and having a considerable number of stock parents, forming several different families in each group of colours. It is not advisable to make violent crosses, such as crossing yellow with pink or rose, or crimson with white. The best results are obtained from work within well-defined lines by intercrossing only such colours as rose, pink, blush, and salmon in one group, crimson, scarlet, and red in another, and orange and yellow in another. Whilst working generally within these lines I should deprecate a slavish adherence to them, as occasions will arise for making experimental crosses, and these are full of interest, though more often than not very disappointing.

It will be readily understood, as I depend on first crosses, how much I welcome a good variety of any colour from another raiser; every such variety obtained opens up a very large field of work, increases the possibility of new breaks, and further lengthens the line of progress. Of course every new introduction has to be very critically examined and used very carefully at first, or the work of years may be undone.

It will now be interesting to compare some of the double varieties existing twenty-five years ago with the more recent introductions. This will help us to appreciate the advances made in the form, size, and colour of the flowers. It will be observed that in the old varieties the petals were small and the flowers did not conform to any particular shape, whilst the varieties of the present day will equal in form the choicest Roses and Camellias, and are larger in size and far more varied in colour than either.

This great alteration has been brought about by a very gradual process of careful fertilization and the raising annually of a great many thousands of seedlings, rigidly selected when in bloom. Hundreds of varieties have been named, each of which has been the selection from thousands, only to be superseded in a more or less short time by others of higher quality.

One of the chief charms of the double Begonia is its great diversity of form, and whilst resembling many other flowers, such as the Camellia, Rose, Hollyhock, and Carnation, there are many intermediate types which cannot be said to resemble either.

I trust this diversity of form will always be retained, and that future raisers will not endeavour to work for any one type to the exclusion of the others.

In the year 1892, when the Begonia Conference was held, mention was made of but two sections of tuberous Begonias, viz. single and double. Now, however, we have two distinct new forms of singles, the frilled and the crested (called by the Continental growers 'Crispa' and 'Cristata'). These are both of Continental origin and are valuable classes, the frilled especially so. They are to be obtained in all colours common to Begonias, and in many the colours are blended beautifully. The combinations of white and pink, and yellow and salmon, have a charming effect. The pure white frilled Begonia often closely resembles a glorified Chinese Primula. The crested varieties are to my mind more curious than pretty. The flowers are single, with a conspicuous crest on the face of each of the four sepals. This crest is often more highly coloured than the sepals, giving a curious and often very pretty effect.

We have lately added another section which we call basket Begonias, because of their being specially well adapted to this style of cultivation. They are all doubles, and their habit of growth, long pointed leaves, pretty pointed sepals and petals suggest *B. boliviensis* as being their progenitor, rather than any other species. They are splendid subjects for the embellishment of the conservatory or any

greenhouse that is lofty enough to permit of their being suspended from the roof over the pathways. Having begun with the varieties 'Alice Manning,' 'Marie Bouchet,' and 'Fleur de Chrysanthème,' we have now a good collection with a wide range of colours. The later varieties are remarkable for their cactus-like form and wonderful freedom of flowering. They are becoming increasingly popular, their graceful habit appealing to many who do not care for the large-flowered double and single varieties. Examples of these are 'Gladys,' 'Fleur de Chrysanthème,' 'Rose Cactus,' 'Golden Shower,' and 'Lena.'

Improvement in the ordinary single Begonia is seen in the flowers being larger, rounder, and of better substance than was obtained formerly. They make handsome plants for the conservatory, but it is in the open flower garden that they excel. For large masses of colour in almost every shade except blue, they are pre-eminent. There is a danger that, in striving to get large flowers, raisers will at the same time get increased size in the leaves. It is possible to get flowers as much as eight inches in diameter, and these are much sought after for exhibition purposes, but an ideal single Begonia for bedding is one of between four and five inches in diameter, borne on erect stems and freely produced on a plant of free branching habit. To get all these qualities combined in single Begonias of all colours will provide work for raisers for many years to come.

Begonias are much used as bedding plants, and they richly deserve their popularity. I fully anticipate a much greater popularity for them when the qualities of our strains of upright-habited double varieties become known. There is an impression among gardeners that single Begonias are better than doubles for bedding because the doubles are so heavy; they will not hold their flowers up. This was quite true when the doubles had such long thin stems that the flowers were on the ground, but it is not true to-day, because now we have doubles whose flowers are more or less erect, and many quite erect, and these, having much greater lasting qualities than singles, give a much richer effect. Our beds of double seedlings have the appearance of masses of very dwarf roses, except that the flowers are so much larger and in so much greater profusion. Seedling tubers of double varieties can now be obtained of excellent quality for bedding, and in all shades of colour ranging from pure white to deep crimson.

To get plants of an even growth and habit and exactly alike in colour, it is necessary to resort to propagation by cuttings. There are a number of named varieties that have been propagated in this way, and some of them are excellent. 'Lafayette' is an old favourite and is a very useful variety, especially for small beds. 'Argus' is a larger variety, bright scarlet, very stiff and upright in habit. 'Hilda' is of a rich salmon shade with lighter centre; the flowers are of good size, and are thrown well above the foliage. It is one of the most beautiful. 'Marquis of Stafford' is old, but still one of the best of

the small-flowered varieties. It is crimson in colour, free-flowering and very neat in habit. Other good varieties are 'Gladiateur,' crimson; 'Lord Langton,' bright scarlet; 'Major Hope,' light rose; and 'President Savoye,' pale yellow.

Time will not permit me to give full details of the cultivation of Begonias, and as the method of raising from seed is generally understood, I will confine my remarks to the growing of plants from tubers for conservatory decoration and for exhibition. They can be had in bloom at any time from the middle of May until the end of October, the tubers for May flowering being started in January, and later batches according to the time it is desired to have them in bloom. The best results are obtained from those started early in March. These can be grown without much artificial heat, and much better results can be obtained if the tubers start quietly and naturally than when they are forced. A temperature of 60 degrees to 65 degrees is warm enough. Boxes about three inches in depth should be used in which to start them. These should be well drained by placing a layer of crocks over the bottom, covering these with half-decayed leaves. The soil should be light and porous, consisting of loam and leaf-mould in equal parts, with a half part of sand. The tubers should be buried to the level of the crown, and will require very little water until they have started. It is a good plan to cover the boxes with some sheets of brown paper. This will prevent evaporation and there will be less danger of the tubers rotting through being over-watered. When they are well started, they can be put into pots according to their size, allowing about an inch of room around each. The soil for this potting should be good fibrous loam three parts, leaf-mould two parts, well-decayed manure one part, with sufficient coarse sand to keep the compost open. Press the soil moderately firmly about the tuber, which when finished should be just buried in the soil. Keep the plants now as near the glass as possible, and in a nice light house with a temperature of about 60°. Give plenty of atmospheric moisture and plenty of ventilation; on bright days a light sprinkling with the syringe will be beneficial.

These conditions should be continued until the plants are in bloom, when the syringing should be stopped. Begonias should be shaded from bright sunshine when grown under glass; and for this purpose movable blinds made of No. 5 garden netting are the best I have seen; but if this is not easily obtainable a light shading should be painted on the glass. They will be ready for their final shift when the roots are found to be running round the sides of the pots and before they get anything like pot-bound; it is better to shift them too soon than to let them become pot-bound.

The soil for this, the final shift, may be a little richer, and should consist of a similar compost to that used before, using rather less leaf-mould and adding a 4-inch potful of Clay's Fertilizer, or other good artificial compound, to each three bushels of soil. The compost should not be too fine, and on no account should it be sifted. Do not

over-pot the plants. Most double varieties will do well in 6, 7, or 8-inch pots unless the tubers are large. If, later on in the year, the plants appear to have outgrown their pots, they can be given a shift with great advantage at any time during the summer, even if they are in bloom, and the blooming period of the plants will be greatly prolonged. Singles require more pot room than doubles, and some of them will fill an 8 or 9-inch pot well. Watering must be well attended to from the beginning, and especially the first three weeks after repotting. The plants will be benefited by an application of manure water once a week when the pots are getting full of roots and they are beginning to bloom. They are gross feeders, but it is better to give them liquid manure often and not too strong. Soot water is good for them and should be given alternately with some good animal manure. It is important to remove all buds until the plants are well established and the pots are fairly well filled with roots. All side buds should be removed from the doubles at as early a stage as possible. This will increase the size of the flowers and there will be less tendency for them to droop.

Seedling tubers, one year old, or early cutting tubers of the previous year, give the finest flowers, but for specimen plants two or three-year-old tubers would be most suitable.

It is not a common practice to propagate single Begonias by cuttings, as they are obtained so easily from seed, but this method of propagating is indispensable for the named double varieties. Cuttings are taken at any time during the summer, either of the shoots that spring directly from the tuber, or of the side shoots; but in either case care must be taken that there is a dormant eye at the base of the shoot, immediately beneath which it must be severed or the cutting will not form a tuber. The cuttings will strike readily if placed in a propagating frame and kept close. They are best inserted at the sides of the pots in a compost made up of equal parts of loam, leaf-mould, and sand. They will make root in about a month, when they should be gradually exposed to light and air. The young plants will be greatly benefited by a shift into 3 or 4-inch pots, using soil similar to that recommended for tubers.

Tuberous Begonias are subject to attacks of green fly, Begonia mite, and eel-worm. Green fly can be easily kept under by the ordinary methods of fumigation. The Begonia mite is the most insidious foe the grower has to fear. Its presence is detected only when irreparable damage has been done to the plants. It is then recognizable by the brownish appearance of the under sides of the young leaves and the points of the shoots, which gradually turn black, wither, and die. The growth of the plants is completely stopped, and they are quite spoiled for the season. (*For many years this was treated as a fungoid disease.*) Plants that are found to be affected should be immediately isolated and sprayed with a strong insecticide. The remainder of the plants should be vaporized with nicotine compound, three times in succession. However, prevention is better

than cure, and to keep this enemy at bay the following precautions should be taken: The Begonia houses must be kept scrupulously clean. The stages and walls should be thoroughly cleansed and washed during the winter months with a powerful insecticide, and every particle of loose soil should be taken away. The tubers also may be dipped into a good insecticide before starting into growth. If these precautions are taken and the plants grown sturdily without much artificial heat, the mite can be kept under, and this, the most frequent source of disappointment to the grower, will cease to trouble him. Eel-worm is also very troublesome in some districts. Its presence is easily detected by the leaves showing dark patches usually near the outside edges, the older leaves being attacked first. These dark patches gradually get larger, the tissue of the leaf is quite destroyed, and the leaf falls off. There is no known means of curing the plants when once attacked. The usual way of treating soil for eel-worm is to sterilize it by steaming or baking, but the method we practise is to add a 4-inch potful of newly-slaked lime to each eight bushels of soil, well mixing it a few days before using. The lime has a very beneficial effect on the soil if used in moderation, and we find it to be a complete preventive of eel-worm. A rather greater quantity than I have mentioned may be used without any bad effects on the plants, and it may be advisable to use more on soils that are suspected of being badly infested.

The cultivation of the Begonia is greatly simplified if these much-dreaded pests are kept under. The care of a large collection, whilst very interesting, is also very exacting work. During the twenty-seven years I have been working amongst them I have had many anxious days, but these have been more than compensated for by the amount of pleasure I have derived from them. That a fair amount of success has attended my efforts has been shown by the Awards given to our firm by the R.H.S. during the eleven years of its existence.

HINTS ON HERBACEOUS BORDERS.

By GEORGE BUNYARD, V.M.H.

IN order to condense my subject into the limits of a short paper, it will be needful to exclude alpine and rock plants, although many of them can be properly placed in the front rows of herbaceous borders.

Preparation.—The first consideration is the preparation of the border, or its renovation and rearrangement if already existing.

In making a new station, mark out the intended area—a border 9 feet wide is best—making use of an existing background, such as a shrubbery, wall, hedge, or fence; but if these do not exist hedges may be formed of any desired evergreen, such as Yew, Holly, Laurel, or, for cheapness, the oval-leaved Privet, but a 3-ft. path or grass verge should be left between the hedge and the border, otherwise the roots of the former will rob the herbaceous plants and interfere with their perfect development. The border should then be trenched 2 feet deep, adding as the work proceeds some well-rotted manure with leaf soil and sand for heavy land, and cow-dung with kainit for lighter soils. The ground should be roughly turned up on the surface for the air and frost to act upon it, and, if possible, some old potting or burnt soil may be usefully incorporated. It will not be needful to take out all the porous stones, as they retain moisture and tend to keep the soil open; but flints should be removed, as they do not absorb water.

In the rearrangement of borders all the existing plants should be first taken out, laying them in handy for re-planting. The ground should then be trenched and enriched as previously advised. It is better that the front of the border should not be quite straight.

Planting.—If the border is 9 feet wide, the back row, 3 feet from the outside, should have tall plants set out at 6 feet apart (if space allows) or 4 feet if the area is restricted; and in this row a good appearance is ensured if a few beautiful flowering shrubs and ornamental foliage are introduced—such as Lilacs, *Spiraea ariaefolia*, *Philadelphus grandiflorus*, *Cerasus Veitchii*, *Pyrus spectabilis*, Crab ‘John Downie,’ *Cotoneaster pannosa*, gold or silver Japanese Maples, and Bamboos of the most graceful tall kinds, such as *aurea*, *anceps*, *nigra*, or *viridi-glaucescens*, and a clump of the tall Reed, *Arundo Donax*. The use of such plants as these is a matter of taste, and other plants may be added to give character and flower at a time when the herbaceous plants are not in flower, such as the white *Cytisus albus*, the yellow Spanish Broom (*Spartium junceum*), and the showy *Cytisus Andreanus*, with *Buddleia Veitchiana*, *Berberis stenophylla*, or any flowering shrubs of upright growth. Some introduce a few Bush Roses, such as the

Moss, Cabbage, 'Cottage Maid,' Austrian Yellow and Copper, and in large borders the Rugosa Roses and their hybrids are very effective. The varieties, 'Mrs. Waterer,' 'Parfum d'Hay,' 'Mme. Lucien Villemot,' are three good crimsons, and the single white variety, the double white 'Blanc double de Coubert,' 'Conrad F. Meyer,' and the pretty pale blush *fimbriata*, are recommended.

Again, in large, wide borders a few pillar Roses at 20 feet apart are striking, such as 'Lady Waterlow,' 'Tausendschön,' 'Hiawatha,' climbing 'Caroline Testout,' climbing 'W. J. Grant,' 'Excelsa,' 'Paradise,' 'Blush Rambler,' climbing 'Capt. Christy,' 'Gruss an Teplitz,' 'Leuchstern,' 'Rosette de la Légion d'Honneur,' 'Aimée Vibert,' 'Trier,' 'Mme. Alfred Carrière,' and 'Sweetheart' are good whites. Climbing 'La France,' and 'Ards Pillar' and 'Ards Rover' (two grand crimsons) are not out of place. The roaming Roses are rather too rampant.

Should it be desired to omit some of the shrubs mentioned, alternative plants would be :

- | | |
|----------------------------------|---|
| *3. <i>Eremurus Elwesii</i> . | 21. <i>Spiraea Aruncus acuminata</i> . |
| 7. <i>Onopordon bracteatum</i> . | 25. <i>Campanula lactiflora alba</i> . |
| 11. <i>Lupinus arboreus</i> . | 29. <i>Cephalaria alpina</i> (cream). |
| 17. <i>Senecio Veitchianus</i> . | 33. <i>Lychnis chalcedonica flore pleno</i> . |

There is a craze, which I have not seen successfully carried out, to have borders all blue, or graduated from white to pink, to golden, to bronze, and up to crimson, but in my opinion a mixed border blooming over a long period is far preferable.

Taking then a back row of herbaceous plants only, I have indicated on the plan (p. 359) where a shrub may be introduced, if required, by a star, but it would not spoil the arrangement if omitted.

It will be readily understood that such a plan is open to criticism or rearrangement, but it is compiled after careful thought, and many really good things may have been omitted because the choice of subjects is so extensive and tastes differ.

As I have suggested, the front edge should be scalloped and thus form suitable positions for the very dwarf growers, and, if preferred, a continuous line of white Pinks, *Gentiana acaulis*, purple Thrift, Aubrietias, &c., may be used to finish off the front row or rows; or many dwarf kinds may be used in patches of three or five each.

Planting Time.—September and October are suitable months for planting if the soil of the border is light and friable, but in heavier land it is safer to prepare the border and plant in March or April, as winter frosts mellow the surface and enable the soil to be more closely and firmly pressed round the roots and collars of the plants. In planting it is very important that the lower roots—often more fleshy than fibred—should be put down full length, and not be curled round to fit the hole prepared for them, as it is upon these main roots that the plants rely to withstand the spring or summer drought.

* These numbers refer to the position on the plan (p. 359).

When autumn planting is adopted the border should be gone over in March to settle down any plants that may have been lifted by frost in winter, after which the border should be raked over neatly.

If at the spring planting the weather should prove dry, start the plants by giving them a watering just before finishing the planting, and if after watering some loose soil is raked round the plants it will check evaporation and keep the soil moist for a long period. Some subjects, such as Pyrethrums and Pentstemons, should be planted only in the spring.

Presuming the borders are now planted, the next operation is the thinning out of superfluous shoots in May. This particularly refers to such plants as Phloxes, Michaelmas Daisies (Asters), *Helianthus*, and Delphiniums. First cut out the thin and weakly shoots, and leave three or five only of the strongest and most promising—and at this time search for snails and slugs, which are very fond of Delphiniums—and sprinkle some lime or soot around them to check their depredations. As the shoots grow it will be needful to secure the growths, and for this purpose some green wooden sticks, or bamboos coloured green, should be used, the shoots being loosely attached with bast to allow for growth. For the back row they would need to be five feet long—one foot underground and four feet above—in order that when the shoots grow and develop they may be hidden by the spread of growth above them; for the next row $3\frac{1}{2}$ feet, then $2\frac{1}{2}$ feet, and there will be many in the fourth front row that can stand alone.

The neglect of staking at an early stage renders the plants liable to be broken off, or to have their growths twisted and distorted so as to spoil them for the season. In staking, practically each stem should have a stick and the points should bend outward. Thus an Aster with five shoots should have the sticks within a 1-foot circle at the base, and from 2 to $2\frac{1}{2}$ feet at their free ends: in this manner air circulates between the stems, and the full beauty of each plant will be displayed. Such subjects as Eremuri will require a stout stake to each spike, while Tritomas (*Kniphofias*) can do without sticks. *Phlomis* bear massive spikes and must be staked. If the first sticks placed prove to be too short owing to free growth, such as takes place in a wet season, longer sticks may be attached without removing the old ones.

It is often urged against herbaceous borders that, although as a whole they give a display over a long period, some plants get shabby after flowering and thus have to be cut down, leaving ugly blanks. This can be remedied by growing on in pots Canterbury Bells, *Campanula pyramidalis* (6 feet), Sweet Williams, Blue and Red Salvias, Castor-oil plants, tall Antirrhinums, Lobelia 'Queen Victoria,' standard Fuchsias, Streptosolen, Heliotropes, Marguerites for back rows, choice Pentstemons, Lilies, and Dahlias, which can be used to fill vacancies by planting near the faded plants; but Delphiniums, if, as soon as the blooms fade, they are cut back to 6 inches from the soil, saving

all possible foliage, will generally bloom again in autumn, and it strengthens the stools of many plants to cut them back before seed pods form.

In November the glory of the border will have passed, and the remaining stalks can be cut down and the border tidied for the winter, taking care to leave all evergreen foliage ; and in the case of a spring-planted border it will be well to liven up the early appearance by planting Daffodils, Scillas, Hyacinths, and other bulbs for spring display, at any time before Christmas.

During the summer and autumn notes should be taken of any clashing of colours or mistakes in grouping that the taste of the owner objects to, in order to remedy faults by removals and replantings for the next year's display.

A border as suggested will stand for two or three years, after which the soil may become exhausted. The plants should then be lifted, and the border manured after taking out some of the old soil and bringing in some fresh fibrous loam. If the border cannot be renewed, it is a good plan to refresh the large clumps of Asters, *Helianthus*, *Phlox*, &c., by spading out the centres of the stools (making a triangular cut), filling in the hole made with fresh soil, as in these and like plants the best growths will be found on the outer edges of the clumps.

In large gardens entire beds of one family, such as Iris, Asters, Phloxes, and Delphiniums, are very striking, and the Asters (Michaelmas Daisies) lend themselves admirably to this arrangement, as they now embrace a great range of colour and the Amellus section are grand for front rows. Delphiniums; of course, look rather flat after they have blossomed and are cut back, but they might be alternated with other plants, such as the Japanese Anemones—the pale pinks and whites of this family would harmonize with the autumn blue spikes of the Delphiniums, and the Anemones are very pleasing. Again, in a Phlox border every alternate plant might be a *Pyrethrum* ; their blooms would be past before the Phlox blossom, and their green fern-like foliage would form a good setting for the bright colours of the Phlox. With the Iris, whose foliage after the flowering season is over is always striking and bold, Lilies such as the easily grown *tigrinum*, *pomponium*, *candidum*, and *Thunbergianum*, can be utilized, with here and there a clump of the Double White *Gypsophila paniculata*. Other combinations could be made for borders of Paeonies, with *Gladiolus* and Lilies, or Montbretias, or bold beds of the Giant Poppies (*Papaver bracteatum* and *P. orientale*). With these some bold-foliaged plants, such as *Acanthus*, *Angelica*, and *Senecio Veitchianus*, should be introduced. Poppies are apt to lose all their leaves in summer, but they come fresh and green again in autumn.

A word as to Paeonies. These are often starved in borders when mixed with other plants, and are therefore best planted 4 feet apart on ground trenched 2 feet deep, using soil made very rich with manure, sand, and leaf soil. After planting, mulch the surface with half-rotten dung, and fork in just under the surface about March without

at all disturbing the roots ; then, when the growth is 1 foot tall, sprinkle on the surface 2 oz. to the yard of nitrate of soda, and hoe it in around the plants, and they will give you grand blooms when established. When the stems carry more than 2 buds, thin them out, and for exhibition only leave the best (one) bud and stake them so that the blossoms do not fall over with their weight. Paeony foliage remains till autumn and often assumes brilliant colours ; between the plants the smaller growing Asters (Michaelmas Daisies) could be planted with effect. The single Paeonies need not be disbudded, and when secured the sticks should not be visible.

A list of the very best and newest varieties in each section may be of service to those whose borders need refreshing. The prevailing colours are given, and readers who are often puzzled by perusing catalogues may rely on getting good results from this selection.

ASTERS (MICHAELMAS DAISIES).

Large-flowered.

'Beauty of Colwall'	Pale blue, double	3 feet
'Climax'	Pale slate blue	5 "
'Esther'	Delicate pink	2 "
'Daisy Peters'	White	3 "
'Mrs. Day'	Rosy pink. Early	4 "
'Mrs. S. T. Wright'	Rosy blue	4 "
'Norah Peters'	Creamy white	4 "
'R. Parker'	Lavender blue. Early	4 "
'Lil Fardell'	Carmine red	4 "
<i>novae-angliae pulchellus</i>	Violet	5 "
'Mrs. Rayner'	Magenta	4 "
'Saturne'	Rich blue	5 "
'St. Egwyn'	Bright pink	3 "
'Thirza'	Soft mauve	5 "
'Top Sawyer'	Blue	5 "
'White Queen'	Starry	4 "

Small-flowered, Feathery Growth.

'Amity'	White	2 feet
'Approval'	White. Late	6 "
<i>cordifolius albulus</i>	Pale heliotrope	3 "
<i>cordifolius</i> 'Ophir'	Pale mauve	3 "
<i>cordifolius</i> 'Photograph'	Rich lilac	3 "
<i>cordifolius</i> 'Ideal'	Lavender	4 "
'Coquette'	Pink shaded	3½ "
'Daydream'	White	4 "
'Debonair'	White	6 "
'Hon. Vicary Gibbs'	Pink	3 "
'Harmony'	Pale rose	3½ "
<i>paucifolius</i>	Starry white. Late	4 "

'Symphony'	Pale mauve	4 feet
<i>turbinellus</i>	Lavender	4 "
<i>turbinellus elegans albus</i>	White, starry	3 "
<i>Tradescanti</i>	White. Drooping. Late	3 "

In the Amellus dwarf section, the best are :

'Beauté parfaite.'	'Perry's Pink.'
'Cactus.'	'Perle Rose.'
'Blue Stone.'	'Preciosa.'
'Distinction.'	'Onward.'

These are rich shades of violet and slate blue.

DELPHINIUMS.†

* 'Alake'	Splendid violet	Tall
* 'Bassanio'	Ultramarine, white eye	"
* 'Belladonna flore pleno'	Azure	Dwarf
'Cappadocia'	Creamy white	3 feet
* 'Coriolanus'	Peacock blue	4 "
* 'Cymbeline'	Violet, white eye	4 "
'Capri'	Silvery blue, elegant growth	3 "
* 'Daniel'	Slate blue and white	3 "
* 'Hermia'	Nemophila, blue	3 "
* 'Hypatia'	Topaz and bronze	3 "
'Hamlet'	Bronzy violet	4 "
* 'Jessica'	Azure and rose	4 "
* 'King of Delphiniums'	Metallic violet and white	3 "
* 'Lady Conway'	Silvery azure	3 "
'Lamartine'	Violet	Dwarf
* 'Lorenzo'	Bronzy violet and white	5 feet
* 'Medea' (Ferguson)	Metallic, violet, white eye	3 "
* 'Minerva'	Pale azure, shaded	4 "
'Mrs. Helm'	Silvery blue	Tall
* 'Macbeth'	Deep bronzy violet	4 feet
'Mme. Laizer'	Light blue, dark eye	Dwarf
'Mrs. Brunton'	Palest azure	2½ feet
'Moerhoemii'	Newest white	3 "
* 'Mrs. Creighton'	Deep blue	4 "
* 'Nineveh'	Azure, dark eye	3 "
* 'Nerissa'	Sky blue and white	4 "
* 'Ophelia'	Silvery blue	4 "
'Orchioides'	Creamy white, black eye	3 "
* 'Pharaoh'	Azure and white	3 "
'Persimmon'	Silver blue	2½ "
* 'Rev. E. Lascelles'	Topaz, white eye, the finest	
	double	6 "
'Shylock'	Bronzy violet and white	5 "

* Double-flowered varieties.

† The heights given are generally about two-thirds of the height attained by the same variety at Wisley (see JOURNAL R.H.S. xxxviii. p. 262).

GERMAN FLAG IRIS.

<i>asiatica</i> , violet, tall.				'Mrs. Reuthe,' mauve blue.
<i>pallida dalmatica</i> , W. Wilks				'Mrs. H. Darwin,' creamy veined.
var., azure.				'Mrs. Neubronner,' golden.
'Dorothea,' pale blue.				'Lohengrin,' pink, extra large.
<i>germanica Kochii</i> , violet.				'King of Iris,' rosy pink.
'Her Majesty,' pink.				'Princess Beatrice,' pale blue.
'Innocenza,' white.				'Queen of May,' pink.
'Jacquiniana,' chocolate.				'Robert Burns,' yellow and bronze.
'Kitty Reuthe,' blue and white.				'The Bride,' white.

PAEONIES.

<i>alba superba</i> , grand white.				'Mme. Rousellon,' pale flesh
<i>albiflora laciniata</i> , single.				'Modeste,' bright rose.
'Amalthea,' pale pink.				'Monsieur Rousellon,' ivory and
'Baroness Schröder,' rose and				blush.
cream.				'Mrs. Chamberlain,' rosy pink.
'Duchesse de Nemours,' ivory.				'Peach Blossom,' flesh and salmon.
<i>festiva maxima</i> , white and				'Sulphureus,' white and yellow.
claret.				'Triomphe,' silvery rose.
'Lady L. Bramwell,' silvery pink.				<i>Whitleyi major</i> , grand white.
'Lemon Queen,' silvery centre.				Tree Paeonies vary in colour
'Marie Jaquin,' white.				from white to crimson and
'Mme. Calot,' flesh.				amaranth.

GIANT POPPIES.

Eighteen best.

Brightness,' orange scarlet,				'Mogul,' orange scarlet.
tall.				'Princess Ena,' pale salmon.
<i>bracteatum</i> , blood red.				'Queen Alexandra,' soft salmon.
'Blush Queen,' black spots.				'Rembrandt,' brick red.
'Fürstenkind,' blush and silver.				'Silver Blick,' scarlet, white
'Grenadier,' largest scarlet.				blotches.
'Hesperia,' self scarlet.				'Silver Queen,' French white.
'Jennie Mawson,' creamy salmon,				'Tulip,' spotted scarlet, 2½ feet.
black spots.				'Tom Tit,' dwarf scarlet.
'Lady Roscoe,' soft salmon.				'Unique' (Perry), scarlet fringed,
'Lovely,' intense scarlet.				2 feet.

PYRETHRUMS.

* 'Agnes Mary Kelway,' rosy				'Carmen Sylva,' white.
pink.				'Bassanio,' deep red.
* 'Albert Victor,' crimson.				* 'Decoy,' bright crimson.
'Beatrice Kelway,' rosy pink.				* 'Fairy,' rose pink.

* Single varieties

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| * 'General French,' dark crimson. | 'Mrs. Bateman Brown,' crimson. |
| 'Jubilee,' intense red. | * 'Margaret Moore,' blush. |
| * 'Jas. Kelway,' dazzling crimson. | 'Queen Mary,' very large pink. |
| * 'Mrs. Allfrey,' crimson. | * 'Sylvia,' pale pink. |
| 'Mrs. Santley,' rosy. | 'Warrior,' velvety red. |

PHLOXES.

Growing 1 to 2 feet.

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| 'A. J. Ashmore,' flesh pink. | 'Jocelyn,' bright dark crimson. |
| 'Argon,' blush. | 'Lady Tweeddale,' white with blush. |
| 'Belvedere,' deep rose. | 'Mme. P. Charpentier,' white. |
| 'Doreen,' salmon pink. | 'Mrs. J. Harkness,' salmon. |
| 'Elizabeth Campbell,' pale cerise. | 'Mrs. Oliver,' soft salmon. |
| 'Eugène Danzanvilliers,' white and black. | 'Miss Pemberton,' crimson lake. |
| 'Fiancée,' white, extra. | 'Rijnstroom,' large pink. |
| 'Frau A. Büchner,' best white. | 'Regulus,' rosy carmine. |
| 'Freifräulein von Lassburg,' large white. | 'Sheriff Ivory,' deep red and rose. |
| 'Gruppenkönigin,' rose dark eye. | 'Snowdon,' large white. |
| 'John Lamont,' lilac rose. | 'Spirite,' rose and crimson. |
| | 'Tapis blanc,' dwarf white. |

Growing 2½ to 4 feet.

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| 'Aurora,' reddish crimson. | 'Flambeau,' bright crimson. |
| 'Baron von Dedem,' striking crimson. | 'G. A. Strohlein,' orange scarlet. |
| 'Coquelicot,' dazzling carmine. | 'General von Heutsz,' salmon red. |
| 'Countess of Shrewsbury,' white, pink eye. | 'Iris,' shaded violet. |
| 'Dame de Beauté,' lilac and white. | 'Mme. Neera,' silvery mauve. |
| 'Dr. Charcot,' heliotrope. | 'Mrs. Jenkins,' fine white. |
| 'Etna,' fiery carmine. | 'Selma,' rosy crimson. |
| | 'Solon,' carmine red. |
| | 'Starlight,' orange red. |

* Single varieties:

PLAN OF HERBACEOUS BORDER.

Back Row.		Third Row.		Second Row.	
6 feet apart.		3 feet apart.		3 feet apart in clumps of 3'.	
1. <i>Galega Harlandii.</i>		35. { Aster 'Mrs. Rayner.' Achillea Eupatoria.		69. <i>Iris flavescens.</i>	
2. <i>Bocconia cordata.</i>		36. { Delphinium 'Persimmon.' Anemone japonica 'Queen Charlotte.'		70. Poppy 'Mrs. Marsh.'	
3. *		37. { Aconitum variegatum. Cimicifuga simplex.		71. Aster 'Coquette.'	
4. <i>Helianthus multiflorus.</i>		38. { Pink Hollyhock. Delphinium 'Sailor Prince.'		72. <i>Iris pallida dalmatica.</i>	
5. Aster 'White Queen.'		39. { Monarda didyma. Spanish Broom.		73. <i>Achillea</i> 'The Pearl.'	
6. <i>Campanula lactiflora.</i>		40. { Eryngium tripartitum. Aster cordifolius magnificus.		74. Phlox 'Coquelicot.'	
7. *		41. { Telekia macrocephala. Gypsophila acuta.		75. Double Gypsophila.	
8. <i>Anchusa italica</i> , Dropmore var.		42. { Iris Monnieri. Boltonia latisquama.		76. Scarlet Lychnis.	
9. Pampas Grass.		43. { Cytisus Andreanus. Campanula bononiensis alba.		77. Poppy 'Fürstenkind.'	
10. <i>Echinops Ritro.</i>		44. { Delphinium 'Calypso.' Boltonia asteroides.		78. Aster 'St. Egwyn.'	
11. *		45. { Aster novae-angliae ruber. Geranium pratense striatum.		79. Phlox 'Jeanne d'Arc.'	

* The blank spaces are left for flowering shrubs as named in the letterpress.

PLAN OF HERBACEOUS BORDER—continued.

<i>Back Row.</i>		<i>Third Row.</i>		<i>Second Row.</i>	
6 feet apart.		3 feet apart.		3 feet apart in clumps of 3.	
12. <i>Verbascum olympicum.</i>		46. { <i>Carduus heterophyllus.</i>		80. <i>Iris intermedia.</i>	
13. <i>Aster</i> 'R. Parker.'		47. { <i>Delphinium</i> 'Hermia.'		81. <i>Anemone japonica elegantissima.</i>	
14. <i>Tritoma glaucescens.</i>		{ <i>Eremurus Elwesii.</i>		82. <i>Delphinium orchoides.</i>	
15. 'King of Delphiniums.'		48. { <i>Centauria macrocephala.</i>		83. <i>Phlox</i> 'Etna.'	
16. <i>Artemisia lactiflora.</i>		{ <i>Aconitum Wilsoni.</i>		84. <i>Romneya Coulteri.</i>	
17. *		49. { <i>Asilbe Davidii.</i>		85. <i>Iris spuria.</i>	
18. <i>Mulgedium Bourgei.</i>		{ <i>Berberis stenophylla.</i>		86. <i>Phlox</i> 'Dr. Charcot.'	
19. <i>Helianthus</i> 'La Perle.'		50. { <i>Centauria Tourneforti.</i>		87. Poppy 'Marie Studholme.'	
20. <i>Aster</i> 'Lil Fardell.'		{ <i>Aster</i> 'Daydream.'		88. <i>Aster</i> 'Mrs. Day.'	
21. *		51. { <i>Delphinium</i> 'Hamlet.'		89. <i>Iris asiatica.</i>	
22. <i>Eremurus robustus.</i>		{ <i>Aster</i> 'Mrs. S. T. Wright.'		90. <i>Lupinus Moerheimi.</i>	
		52. { <i>Campanula pyramidalis.</i>			
		{ <i>Eremurus Bungei.</i>			
		53. { <i>Eryngium planum.</i>			
		{ <i>Epilobium angustifolium.</i>			
		54. { <i>Aconitum Mielichhoferi.</i>			
		{ <i>Solidago</i> , tall yellow.			
		55. { <i>Delphinium</i> 'Nineveh.'			
		{ <i>Campanula macrantha alba.</i>			
		56. { <i>Genista aetnensis.</i>			
		{ <i>Onopordon Salteri.</i>			
		{ Poppy 'Grenadier.'			

23. <i>Rudbeckia</i> 'Golden Glow.'		{	<i>Clematis recta</i> .		
24. <i>Delphinium</i> 'Lorenzo.'		{	{ <i>Erigeron speciosus</i> .		91. <i>Anemone japonica rosea superba</i>
25. *		{	{ <i>Spiraea Van Houttei</i> .		92. <i>Phlox</i> 'G. A. Strohleim.'
26. <i>Tritoma</i> 'Star of Baden.'		{	{ <i>Veronica sibirica</i> .		93. <i>Aster</i> 'Brightness.'
27. <i>Anchusa italica</i> 'Opal.'		{	{ Scarlet <i>Tritoma</i> .		94. <i>Iris</i> 'Mme. Chereau.'
28. <i>Aster p. pulcherrimus</i> .		{	{ <i>Crambe cordifolia</i> .		95. Poppy 'Queen Alexandra.'
29. *		{	{ <i>Geranium armenum</i> .		96. <i>Aster</i> 'Enchantress.'
30. <i>Aster</i> 'Climax.'		{	{ <i>Helenium striatum</i> .		97. <i>Iris</i> 'Rolette.'
31. <i>Delphinium</i> 'Cymbeline.'		{	{ <i>Cistus ladaniferus</i> .		98. <i>Delphinium</i> 'Persia.'
32. <i>Pyrethrum uliginosum</i> .		{	{ <i>Hemerocallis fulva</i> .		99. <i>Anemone japonica</i> 'Whirlwind.'
33. *		{	{ <i>Malva thuringiana</i> .		100. Poppy 'Royal Scarlet.'
34. <i>Helenium autumnale</i> .		{	{ <i>Verbascum densiflorum</i> .		101. <i>Phlox</i> 'Iris.'
		{	{ <i>Delphinium</i> 'Bandmaster.'		102. <i>Iris</i> 'Innocence.'
		{	{ <i>Epilobium hirsutum album</i> .		
		{	{ <i>Centaurea ruthenica</i> .		
		{	{ Red Crown Imperial.		
		{	{ <i>Gynerium pumilum</i> (Pampas).		
		{	{ <i>Liatris scariosa dubia</i> .		
		{	{ <i>Hypericum Henryi</i> .		
		{	{ <i>Phlox</i> 'Lady Shrewsbury.'		
		{	{ <i>Philadelphus erectus</i> .		
		{	{ <i>Thalictrum Delavayi</i> .		
		{	{ <i>Physalis Bunyardi</i> .		
		{	{ <i>Geranium Lamberti</i> .		

* The blank spaces are left for flowering shrubs as named in the letterpress.

Top. Front Row.

In clumps of three, starting in front of *Iris flavescens*.

- | | |
|---|---|
| 103. <i>Pyrethrum</i> 'Decoy.' | 120. <i>Pyrethrum</i> 'Fairy.' |
| 104. <i>Platycodon Mariesii</i> . | 121. <i>Coreopsis grandiflora</i> . |
| 105. <i>Geum Eweni</i> . | 122. <i>Campanula persicifolia</i> , blue. |
| 106. Paeony 'Amalthea.' | 123. Paeony 'Mme. Lebou.' |
| 107. <i>Pentstemon</i> 'Southgate Gem.' | 124. <i>Phlox</i> 'Belvedere.' |
| 108. <i>Aquilegia chrysantha</i> . | 125. <i>Heuchera micrantha</i> . |
| 109. <i>Pyrethrum</i> 'Sylvia.' | 126. <i>Pyrethrum</i> 'Carmen Sylva.' |
| 110. <i>Chrysanthemum maximum</i>
'Mrs. C. Lowthian Bell.' | 127. <i>Campanula persicifolia</i>
<i>Moerheimii</i> . |
| 111. <i>Rudbeckia Newmannii</i> . | 128. <i>Paeonia anemoneflora alba</i> . |
| 112. Paeony 'Glory of Hayshe.' | 129. <i>Geum</i> 'Mrs. Bradshaw.' |
| 113. <i>Achillea Millefolium rubra</i> . | 130. <i>Oenothera Youngii</i> . |
| 114. <i>Campanula Van Houttei</i> . | 131. <i>Pyrethrum</i> 'General French.' |
| 115. <i>Pyrethrum</i> 'Atossa.' | 132. White <i>Aquilegia</i> 'Munstead.' |
| 116. <i>Nepeta Mussini</i> . | 133. Paeony 'Voluptueuse.' |
| 117. <i>Doronicum</i> 'Harpur-Crewe.' | 134. <i>Phlox</i> 'Tapis blanc.' |
| 118. <i>Dictamnus ruber</i> . | 135. <i>Inula grandiflora</i> . |
| 119. <i>Aster</i> 'Demus.' | 136. <i>Pyrethrum</i> 'Albert Victor.' |

THE GENUS *AGAPANTHUS*, WITH A DESCRIPTION OF
A. INAPERTUS.*

By A. WORSLEY, F.R.H.S.

THIS genus has been considered monotypic,* but I think that, even if we restrict our observations to the forms grown in British gardens, we find at least two (if not three) distinct types. Among the forms known in our gardens we find that some are evergreen, some deciduous; some have stems a few inches in length, others are acaulescent; some have creeping rootstocks several inches to a foot long, others have not; some have more or less erect flowers, others are drooping; some have short, open funnel-shaped tubes, others longer campanulate tubes; and some have widely-expanded flowers, whilst in other cases the flowers are semi-patent. These differences are in themselves enough to throw grave doubt on the monotypic character of the genus.

I have raised more than a thousand seedling *Agapanthi* from several dozen different garden types of *A. umbellatus*, *A. Mooreanus*, and from the hybrid between them raised by Mr. SCHEUBEL, and I have found that these various forms reproduce themselves from seed with great constancy. None of them has produced any of the characters peculiar to *A. inapertus*, and hence I think it is clear that the latter plant is specifically distinct from *A. umbellatus*.

Among the forms of *Agapanthus* which I cultivate I can distinguish nine without considering colour varieties:

(1) *A. umbellatus*.—An evergreen plant with large wide leaves, and open-funnel-shaped sub-erect widely expanded flowers. This includes the *A. Leichtlini* of gardens.

(2) *A. Mooreanus*.—A deciduous plant with smaller leaves and flowers, the latter very widely expanded and even recurved, and with shorter tubes.

(3) *A. hybrida* (of Scheubel).—A fertile hybrid between (1) and (2), and fairly equipoised between them. It is deciduous, and is heavily coloured blue or purple on the short stem.

(4) Crosses between (1) and (3) are fairly equipoised, are heavily coloured on the short stem, and are all evergreen.

(5) *A. inapertus*.—A deciduous plant with creeping rootstock, short leaves, a tall scape of drooping semi-patent flowers with long campanulate tube and short pedicels.

* G. BEAUVERD in *Bul. Soc. Bot. Genève*, Vol. II. (1910), with fig.; *Syn. I. A. Weillighi* (hort.). The author admits 3 species and 4 varieties in the genus. He classes them thus—*A. inapertus* [Beauverd sp. nov.]; *A. africanus* [Hoffmannsegg, *Ver. Pflanzenculturen*, 35 (1824)]; and *A. caulescens* [Sprenger ex Wittmack *Gartenflora*, 50. 21 et 281, cum tab. 1487 (1901)].

(6) *A. umbellatus caulescens*.—A recently imported evergreen form from the Cape, with creeping rootstock a foot long, distinct stem some inches long, small foliage, but not distinct from the type in the general aspect of the inflorescence, although the exerted stamens seem distinct.

(7) *A. umbellatus repens*(?).—A small-growing form with creeping rootstock, narrow and short leaves and flowers like *A. Mooreanus*. A variegated-leaved form of this has been long in cultivation. It grows slowly and demands a very dry soil.

(8) *A. umbellatus monstrosus*.—A multipetalous form raised from a 12-petalled flower. This is a most robust plant with leaves $2\frac{1}{2}$ to 3 inches wide and several hundred flowers to the umbel.

(9) *A. umbellatus variegatus falcatus*.—A garden form with falcate leaves.

[NOTE.—The globose-shaped umbels, which have earned for some forms the name *A. globosus*, are an individual and not a racial character, and appear sporadically in the seedlings of all forms of *A. umbellatus*.]

COMPARATIVE DESCRIPTION OF THE FLOWERS OF SOME OF THE ABOVE FORMS AND SPECIES.

		Limb	Span	Tube	Max. width of Segs.	
<i>A. umbellatus</i>	No. 6	$1\frac{7}{8}$	$1\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	Stamens exerted. " short. " rather short. " short. " " Tube darker.
"	"	4	$2\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	
"	"	8	$2\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{2}$	
"	"	1	$2\frac{3}{8}$	1	$\frac{1}{2}$	
" <i>Mooreanus</i>	"	2	$1\frac{1}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	
" <i>inapertus</i>	"	5	$1\frac{7}{8}$	$\frac{7}{8}$	$\frac{3}{8}$	

All these measurements are in inches.

It will be noticed that it is only in *A. Mooreanus*, and in its crosses, that the span of the flowers exceeds the limb.

A. INAPERTUS.

Rootstock creeping, stout, strictly deciduous. Stem about 3 inches high, curving to an erect pose from the creeping rootstock. Leaves 8, stiff, erect, appearing before the flower scape and already partly deciduous at the flowering period, glaucous, deeply channelled, $1\frac{1}{2}$ foot long by $1\frac{1}{2}$ inch wide. Scape 4 feet high, bearing an umbel of less than 100 flowers. Pedicels very short, $1\frac{1}{2}$ inch long. Flowers erect in the bud, but hanging down perpendicularly on expansion, which occurs in August; deep blue in the tube, lighter blue in the free segments, scentless, semi-patent, span $\frac{7}{8}$ inch. Tube, sub-campanulate, $\frac{7}{8}$ inch long. Segments, the free ends an inch long and the entire limb $1\frac{7}{8}$ inch long by $\frac{3}{8}$ inch maximum width. Stamens shorter than limb. Anthers black, pollen greyish, inconspicuous. Style not exerted. Stigma entire. Fruit and seeds unknown.

[NOTE.—This is not a moisture-loving plant like *A. umbellatus*, and will withstand severe drought. In this respect it agrees with

another creeping form described under Section 7. It came to my garden from Messrs. C. G. VAN TUBERGEN, jun., of Haarlem, and is possibly hardy in the South of England. It received an Award of Merit R.H.S. on Aug. 12, 1913. It was originally sent out by M. MAX LEICHTLIN, of Baden-Baden, about 1898, under the name of *A. Weillighi*, by which name it is now known in gardens. It was first described and figured by M. G. BEAUVERD in 1910 as *A. inapertus*. He says that it was first sent from Shilouwane in E. Transvaal to the Herbarium Boissier, in 1903, by M. H. JUNOD, so it would seem as though M. MAX LEICHTLIN had received an earlier importation of the same species.]

CONTRIBUTIONS FROM THE WISLEY LABORATORY:

XV.—POLLINATION IN ORCHARDS.—II.

THE FLOWERING OF PEARS.

By F. J. CHITTENDEN, F.L.S.

It was pointed out in a former communication on the flowering of apples * that there appears to be a fairly definite sequence in the order of flowering in varieties of apples, and that the variation in an observed order is, in any year, relatively slight, no matter in what part of the world the trees may be growing.

In the general introduction to that communication the frequent occurrence of self-sterility among apples was pointed out, and the need for planting varieties flowering at about the same time in close proximity to one another in order that cross-pollination might be easily effected was referred to. Tables were given showing the relative order of flowering of the principal varieties of apples.

In the present article the relative time of flowering of pears is noted.

Self-sterility is a phenomenon at least as common among pears as it is among apples, and one long recognized in this country, though frequently lost sight of. In the former article † the work of WAITE in America on this subject was alluded to, but an interesting communication to our Society on some work done in this country at a much earlier date was overlooked. This communication shows that the need for the cross-pollination of certain varieties of pears was clearly apprehended by the writer, and it will not be without interest to reprint part of it here. The Rev. GEORGE SWAYNE, writing from Dyrham on August 2, 1822, refers, in a letter ‡ read before our Society on August 6, 1822, to the general unfruitfulness of certain varieties of pears, and goes on to recount some experiments which he made with the object of avoiding this unfruitfulness, as follows:—

“I am myself possessed of a striking instance of this untoward disposition in an individual of the genus *Pyrus*, which has for a long time baffled all my attempts to alter its infertile habits; it is that of a ‘Gansell’s Bergamot,’ which has grown for twenty years or more in its present situation against a wall, part of which has a south-west and part a south-east aspect.

“The tree has all the appearance of health and sufficient luxuriance, and has been for several years constantly covered with a profusion of blossoms at the proper season, but has never before this borne more than three or four pears in any one year, and most frequently

* CHITTENDEN, F. J., in *Journal R.H.S.* xxxvii. pp. 350 *et seq.*

† *Loc. cit.* p. 350.

‡ *Transactions of the Horticultural Society of London*, V. (1824), 208-213.

not a single one. It never occurred to my observation, before the year 1820, when I was much occupied in the artificial impregnation of different kinds of fruit, that, out of from nine or fewer, to fifteen or more florets, of which the cluster (botanically corymbus) of the pear-tree consists, only the three lower ones (generally speaking) *set*, or, in other words, are effectually impregnated, for fruiting. Recollecting the practice of the best gardeners, of topping their early beans, *i.e.* of pinching off with the forefinger and thumb the uppermost blossoms, some apparent, and others in embryo, of the general spike, for the purpose of setting the lowest and earliest ones, which would otherwise in most cases prove abortive, I conceived, that removing the upper and central blossoms of the corymbus of the pear, as soon as it could conveniently be done, would have a similar good effect in invigorating the remaining ones, and causing them to set with greater certainty. With this in view, in the spring of 1821, as soon as the three lower blossoms of the corymbi began to show their *white* faces, I set to work with my sharp-pointed scissors on two pear-trees, the one, the 'Gansell's Bergamot' above mentioned and the other a 'Brown Beurré,' and in as short time as I could have properly thinned two dozen bunches of grapes I divested both these trees of at least three-fourths of all their budding honours. On the 'Beurré,' this operation subsequently appeared to have the best effect. For there was scarcely an instance in which the three remaining blossoms did not *set*, which afterwards produced the finest crop of pears I have yet gathered from that tree. But on the intractable 'Gansell,' although the blossoms at first seemed to set, and many of them did not fall off till midsummer, when they were nearly as large as common gooseberries, yet not a single pear arrived at maturity. By dissecting many of the largest of those which fell off last, and comparing them with some of the 'Beurrés' of the same age and size, it was plain that the kernels of the former had not been impregnated. This circumstance induced me to think that there must be some imperfections in the essential parts of the blossoms.

" In the following spring of 1822, on attending to the blossoms of this tree, which blooms earlier than any other pear-tree which I have, they appeared to me to remain much longer in a globular state, without expanding, than any other variety of pear which I have had an opportunity of noticing. I fancied likewise that the pointal was fit for impregnation before the anthers were ripe, and even before the petals expanded; and from the peculiarly slender and delicate make of the latter, as it struck me, I supposed that it ceased to be in a proper state as soon as it became exposed to the sun and air; I therefore concluded, that there might possibly be a chance of obtaining fruit, by depriving the blossoms of their petals before they expanded, and inclosing with each floret in this state, within a paper envelope (as is my mode of effecting artificial impregnation), a riper *blossom*, viz. one that had just begun to diffuse its farina, either one of its own or, preferably, of some other variety of pear. Accordingly on March 27, 1822, I began this operation,

and in a day or two had tied up in the manner just mentioned twenty-seven blossoms. Ten of these envelopes contained blossoms of the Beurré Pear, which (it not blooming so early as the Gansell) were the only ones I could then find in a state of expansion. Fourteen (to make up, with the former number, two dozen) contained blossoms from the same tree, and three blossoms of the Pound Pear. From the latter, presenting a large and coarse appearance, I had little expectation. I intended to have done many more, but the weather getting colder, and being myself not quite in health, I neglected it till it was too late. The papers were not taken off till April 15, on which day the weather began to be warmer without sunshine. You will please to observe that I had previously cut off from all the corymbi, with which the tree was abundantly furnished in every part, all the blossoms except the three lower ones, as in the former year; and that, having tied up but one of these in each corymbus, I immediately cut off the two remaining ones. The blossoms were operated on in different parts and aspects of the tree, for part of it, as I said before, faced the south-east and part the south-west. Of the ten blossoms treated with the Beurré Pear, *eight set*, two of which afterwards fell off, but I suspect not fairly, and six are now proceeding to maturity. *One* only of the *fourteen*, where its own blossoms were used, now remains. Of the *three* wherein the Pound Pear was concerned, the whole failed. The only pear now on the tree which set naturally, and on which no operation was performed, was produced on a cluster of blossoms, at the extremity of a leading horizontal shoot of last year, which did not make its appearance until after the others had dropped off. . . . The pears are now from five and a half to seven and a half inches in circumference.

“Whether the results of the above detailed experiments be such as to authorize an expectation that artificial fecundation will hereafter become of so much importance to gardeners in the instances just alluded to as those at present recognized, of the cucumber, the melon, the early bean, and the Hautbois strawberry, must be left to futurity to ascertain.”

Mr. SWAYNE's communication is followed by a note from the Secretary:—“Mr. SWAYNE sent to the Meeting of the Society, on October 1, specimens of the Pears alluded to in the foregoing communication. They were unusually large, and very handsome. The cross impregnation had not produced any change in the appearance of the fruit, nor was any difference in flavour discovered.”

It seems perfectly clear therefore that Mr. SWAYNE clearly recognized the value of cross-pollination in the case of some varieties of pears, and some subsequent writers on fruit-growing refer to it in more or less lucid terms. For instance, Mr. HARRISON, in *A Treatise on the Culture and Management of Fruit Trees* (1823), advocated hand pollination of pears which flower abundantly but fail to set fruit, a common experience, he says.* He does not, however, make it clear

* *Loc. cit.* p. 148.

whether he uses pollen of other varieties or not, though he explicitly recommends that this should be done in the case of the White Nectarine, among other fruits.*

It was not, however, until WAITE † published his results that really serious attention began to be given to the matter, and since then this factor has become recognized more and more as an important one in governing the arrangement of the orchard. So far as our present knowledge goes, we know it is advisable to plant varieties flowering at approximately the same time in close proximity to one another so that insects can readily carry pollen from one tree to another. With the object of assisting this the following list made at Wisley has been drawn up.

It is desirable to point out that we do not yet know with certainty whether better fruit and more of it is produced when some varieties furnish the pollen than when it comes from others, nor do we know whether the comparatively few self-fertile varieties are more fruitful when cross-pollinated. These matters are forming the subject of further investigation at Wisley and elsewhere.

The following list is based upon observations made in 1908, 1910, 1911, 1912, and 1913. The observations were made as a rule on two trees of the variety (one generally on quince, the other on pear stock, but the stock apparently makes little or no difference in the flowering time when the trees have reached a fair age). The date of full flowering was noted in each case, full flowering meaning that about 50 per cent. of the blossoms were open. The average number of days after the date of full flowering of the earliest variety is given before the name of the variety in the list, the earliest variety being taken as 1.

As with apples there is no hard and fast order of flowering; every season sees some alteration in it; but the list is accurate so far as to show what varieties may be expected to be in flower at about the same time.

A few flowers on a tree may be open long before the bulk, just as it is no uncommon thing to find a few flowers open long after the rest on a tree. Both cases were well illustrated at Wisley this season, for 'Brockworth Park' had stray flowers open in mid January and all through the winter and early spring a few flowers could be found, the bulk not opening until April; while almost every variety bore summer flowers in greater or less profusion. By taking the date of flowering as that at which about half the flowers are open these curious seasonal variations are avoided and a comparison of the effective period of flowering is made possible.

* *Loc. cit.* p. 235.

† WAITE, "Pollination of Pear Flowers" (*U.S.A. Dep. Agr., Div. Veg. Path., Bull.* 5, 1895).

LIST OF PEARS IN ORDER OF FLOWERING AT WISLEY.

1·2	Brockworth Park	8·6	Beurré Fouqueray
1·4	Zoë		Charles Ernest
2	Doyenné d'Alençon		Triomphe de Jonghe
3·5	Directeur Hardy	8·7	St. Luke
	Forelle	8·8	Bergamotte Heimbouurg
4·6	Doyenné Boussoch		Duchesse de Bordeaux
5·1	Knight's Monarch	8·9	Comte de Lamy
5·2	Belle Guerandaise		Marie Benoist
	Beurré Baltet Père	9	Fondante d'Automne
	Madame Treyve		Nouvelle Fulvie
5·5	Doyenné d'Eté	9·1	Bergamotte Esperen
6·2	Jargonelle	9·3	Marguerite Marillat
5·7	Beurré d'Anjou		White Doyenné
6·8	Aspasie Aucourt	9·4	Beurré d'Aremberg
	Beurré Easter		Durondeau
	Beurré Hardy		Summer Beurré d'Aremberg
	Chaumontel	9·7	Fondante de Thirriot
6·9	Citron des Carmes		Winter Orange
	Marquis	9·8	Beurré Clairveau
7	Beurré d'Avalon		Olivier de Serres
7·1	Passe Crassane		Petite Marguerite
7·2	Baronne de Mello	9·9	Calebasse Grosse
	Beurré Diel	10	Seckle
	Van Mons Léon Leclerc	10·1	Uvedale's St. Germain
7·3	Thompson	10·2	Bellissime d'Hiver
	Verulam		Louise Bonne of Jersey
7·4	Dana's Hovey		Zéphirin Grégoire
	Princess	10·3	Magnate
7·5	Conseilleur de la Cour	10·4	Clapp's Favourite
7·6	Conference		Emile d'Heyst
7·8	Brown Beurré		Marie Louise d'Uccle
	Madame Millet		President Barabé
	Winter Nélis		Beurré Jean van Geert
7·9	Beurré Superfin	10·6	Parrot
	Duchesse d'Angoulême	10·8	Beurré de l'Assomption
8·1	Beurré d'Amanlis	11·1	Autumn Nélis
	Gratioli de Jersey		Triomphe de Vienne
	Van Mons	11·2	Kelway's King
8·2	Beurré Bachelier	11·4	Catillac
	Beurré de Jonghe	11·5	Beurré Dubuisson
	Souvenir du Congrès	11·7	Beurré Dumont
8·4	Beurré Giffard	11·8	Fertility
	Fondante de Cuerne	12	Beurré Rance
8·5	Colmar d'Eté		Le Lectier

	Nec Plus Meuris		Dr. Jules Guyot
12.2	Hacon's Incomparable	14.2	Beurré Bosc
	Huyshe's Prince Consort	14.3	Beurre de Mortillet
	Josephine de Malines		Marie Louise
	President d'Osmondville	14.7	Gilogil
12.3	William's Bon Chrétien	14.8	Passe Colmar
12.5	Belle Julie	15	General Todleben
	Huyshe's Victoria	15.6	Jean de Witte
12.8	St. Edmund		Nouveau Poiteau
13.3	Beacon	15.7	Glou Morceau
13.6	Hessle	15.8	Doyenné du Comice
13.8	Gansel's Bergamot		Michaelmas Nélis
13.9	Beurré Capiaumont	16	Pitmaston Duchess
	Beurré Sterckmans	16.7	Napoleon
14	Grégoire Bordillon		

There appear to be very few lists existing giving averages of order of flowering over several years. Mr. C. H. HOOPER has kindly placed at my disposal some lists he collected from various sources, but they unfortunately relate to one year only as a rule. Some appear to give dates of opening of the first flower, some of full flower, and some of a few days after opening of first flower. These and other differences make the lists difficult to compare with one another profitably. There is a general similarity in the lists though in one or two instances there are marked differences from the Wisley order. These differences are probably to be accounted for partly for the reasons given above and partly because there are minor variations from the usual order of flowering every year.

It is interesting to note that in a list from Victoria, Australia,* 'Winter Nélis,' 'Souvenir du Congrès,' and 'Uvedale's St. Germain' are named as mid-season flowering varieties, 'Beurré Berckmans' (possibly a misprint for 'Beurré Sterckmans') a little later, and 'Beurré Bosc' and 'Williams' Bon Chrétien' among the late ones, the other varieties named in Mr. WALLIS' list not appearing in ours. These seem to indicate that pear varieties, like apples, maintain their relative times of flowering even at the Antipodes. Mr. HOOPER's own observations made at Wye, Kent, give the order for full flowering, from an average of three years, 1908-1910, as follows: 'Duchesse d'Angoulême,' 'Beurré Clairgeau,' 'Beurré Diel,' 'Marguerite Marillat,' 'Williams' Bon Chrétien,' 'Doyenné Boussoch,' 'Beurré Giffard,' 'Dr. Jules Guyot,' 'Clapp's Favourite,' 'Beurré Hardy,' 'Triomphe de Vienne,' 'Souvenir du Congrès,' 'Jargonelle,' 'Catillac,' 'Marie Louise d'Uccle,' 'Durondeau,' 'Pitmaston Duchess,' 'Doyenné du Comice.' The most important differences between this list and the Wisley one are the early position of 'Williams' Bon Chrétien' and the late position of 'Durondeau.' It is possible that "full flower"

* WALLIS, E., "Sterility in Fruit Trees." (*Jour. Dep. Agr. Victoria* ix. (1911), pp. 18, 19).

does not mean quite the same in this case as it does in the Wisley list, and that would make some little difference ; further, it is to be remarked that only eight days separate the earliest and the latest in Mr. HOOPER's list, whereas, taking the same varieties at Wisley (over a longer period), there is an average of twelve days between the full-flowering of the earliest and the latest.

It may be concluded that there is a general regularity in the order of the flowering of pears as with apples ; but that each season sees deviations from the order, not sufficiently marked, however, to destroy the value of the list given above as a guide to the varieties that should be planted near one another in order to facilitate pollination.

I have to thank several of the senior students in their successive years for assistance in making the records on which these observations are based, and particularly Messrs. B. P. PERRY, A. J. PREECE, and C. W. DANIELS.

XVII.—AMERICAN GOOSEBERRY MILDEW

(Sphaerotheca mors-uvae (Schwein.) Berk.)

By F. J. CHITTENDEN, F.L.S.

THIS now too well-known disease has been already described and its history detailed in our JOURNAL,* but it will probably be not without interest to recount the behaviour of the gooseberries at Wisley towards it.

The origin of the outbreak at Wisley is not known. It was first noticed on a few bushes in November 1910, after the leaves had fallen. Careful examination showed that about forty bushes were slightly attacked, some rather worse than others, but none to an extent greater than would follow from an attack starting in late summer, especially in such a wet period as occurred in 1910 (July–October rainfall 8·73 in.).

None had been seen in previous years, although watch was kept for anything of the kind, and no gooseberry bushes had been brought into the garden for two years prior to the outbreak. A few currants, which are also liable to attack, were introduced, but examination of these showed no trace of mildew. No gardens in the immediate neighbourhood are known to have been attacked, nor are any other gooseberries growing within a mile of the site of the plantation. It would therefore seem that the spores of the fungus were brought into the garden either on some other plant or on packing material, or by wind or insects from a considerable distance.

The bushes were pruned in January 1911, every shoot being shortened back over the whole plantation, both on the bushes attacked and on those free from the attack, in the manner known as “tipping,” so as to remove all parts of the shoot on which the resting fruits of the fungus might be present. It was, however, feared that the tipping was done too late to prevent many of the perithecia from falling to the ground and remaining as a source of danger in the succeeding season. It was, therefore, a pleasant surprise to find that in the very dry season of 1911 no trace of the disease was found until the very end of September, and then on one bush only, this piece being promptly destroyed.

The exigencies of cultivation necessitated the removal of the bushes in November 1911 to a site about 200 yards distant from their former one, and in removing them the greater part of the soil about them was left perforce behind, since it was of so light a nature. It is interesting to note that the common gooseberry sawfly had been a prevalent pest from 1907 to 1911, but after the removal of the bushes

* SALMON, E. S. “The Gooseberry Mildew.” (*Journal R.H.S.* xxv. (1900), p. 139.)

ERIKSSON, J. “Gooseberry Mildew and Gooseberry Cultivation.” (*Loc. cit.* xxxiv. (1908), p. 469).

only very few were found in 1912, owing, doubtless, to the pupæ having been left behind with the old soil. This point is of some importance, for the perithecia of the fungus (if there were any remaining over from 1910 crop) would probably have been left behind too. The bushes were pruned and it seemed evident that in January 1912 they were free from the fungus.

About the time the fruits were swelling in May 1912, however, the mildew again appeared, mostly at one end of the plantation (not on varieties that had been attacked in 1910), but quickly spread all through, attacking not only the young growths but seriously damaging the fruits as well. Whence did the attack come? No new gooseberries or currants had been introduced to bring it afresh, and yet it was to all appearance a fresh attack. Had insects or wind brought the spores, or had someone coming from an affected plantation brought them on his clothes and left them behind in walking through the bushes?

The bushes were again thoroughly tipped in October as soon as growth had ceased, and, it was hoped, before the perithecia had fallen. But this measure was quite in vain, for in 1913 the attack was at least equally bad, commencing at the end of May, spreading rapidly through the plantation, and attacking the berries as in 1912. Probably, if the berries were not attacked, the disease would be regarded as not more serious than the ordinary rose mildew, but the attack on the fruit causes the loss of a great part of the crop, the berries being checked in growth, badly disfigured, and not able to be marketed. [It is now, rightly, illegal to send mildewed fruit to market, and several cases of transgression have recently met with fines.

No spraying measures were adopted until 1913, but it was thought well to spray in early May with potassium sulphide (liver of sulphur) as a preventive measure, which was, as we have seen, unavailing. The spraying was done before the mildew made its appearance, with a solution of 1 oz. to 3 gallons of water. [If complete protection by covering the foliage with a fungicide were aimed at, it would have been necessary to spray every other day or so, since the bushes were in a state of rapid growth. This was of course impossible, and the most that could be hoped for was the protection of the least susceptible parts and the destruction of any spores that happened to be germinating. This spraying had no bad effect on the foliage. It was carried out during dull weather, as were the sprayings to be referred to immediately.]

After the outbreak appeared a further spraying with sulphide of potassium (1 oz. to 3 gallons of water) was carried out. This had a remarkable effect upon the bushes, some of them being almost completely defoliated within 24 to 36 hours, others suffering not at all.

Table I. shows the extent of the damage and the manner in which the different varieties responded to the spraying.

It should be explained that there are usually two bushes of each variety in the plantation, though occasionally there are three and sometimes only one. The number following the name in the table shows the number of bushes behaving in the manner indicated at the head of the column.

TABLE I.—SHOWING EFFECT OF SPRAYING GOOSEBERRIES WITH
LIVER OF SULPHUR AT WISLEY, JUNE 1913.

Varieties losing many leaves.	Varieties losing some leaves.	Varieties unaffected.
Australia . . . 2	Alma . . . 2	British Queen . . 2
Beauty . . . 1	Antagonist . . . 2	Berry's Early Kent. 2
Champagne White . . 2	Bobby . . . 1	Bayslate Hero . . 2
Clayton. . . . 3	Careless . . . 2	Bollin Hall . . . 2
Clifton 1	Champagne Yellow . 1	Broom Girl . . . 2
Crown Bob . . . 2	Cramp 2	Candidate 3
Diamond 2	Coppice Lass . . . 2	Catherina 1
Eskender Bey. . . 2	Criterion 2	Champagne Red . . 1
Flora 1	Crown Bob 1	Coiner 3
Flixtonia 1	Drill 2	Crystal 3
Golden Gem 2	Dan's Mistake . . . 1	Duster 1
Glenton Green . . . 2	Fearless 1	Duke 1
Great Eastern . . . 2	Eva 1	Duke of Suther-
Green Walnut . . . 1	Gipsy Queen 2	land 2
Highlander 2	Golden Lion 1	Eagle 2
Lord Audley 2	Green Hedgehog . . 1	Early Green Hairy . 2
Lord Derby 2	Hastenwell 1	Foreman 1
Lord Rancliffe . . . 2	John Anderson . . . 1	Forester 1
Magistrate 1	Langley Gage. . . . 2	Freedom 1
Mayor of Oldham . . 1	Langley Beauty . . . 1	Garibaldi 2
Major Hibbert . . . 1	Leveller 2	General 2
Nottingham 2	London City 2	Goliath 1
Oldham 1	Lord Scarborough . 2	Gretna Green . . . 2
Overseer 3	Matchless 1	Greenock 1
Pretty Boy 1	Nonpareil 1	Green Laurel 1
Random Green . . . 2	Napoléon le Grand . 1	Hannah 1
Rough Red 1	Monarch 1	Highlander 1
Ringer 1	Peru 2	High Sheriff 2
Slaughterman. . . . 2	Pilot 2	Ironmonger 2
Sunset 1	Pitmaston Green-	Jenny Lind 1
Surprise. 2	gage 2	Jenny Jones 2
Telegraph 1	Ploughboy 1	Keen's Seedling . . 2
	Progress 1	Keepsake 1
	Railway 2	King of Trumps . . 2
	Rifleman 2	Lady Leicester . . . 2
	Scotch Nutmeg . . . 1	Lancashire Lad . . . 3
	Rumbullion 1	Lancashire Gunner . 1
	Rosebery 2	Lady Haughton . . . 2
	Shiner 1	Langley Green 2
	Scotch Red Rough . 1	Leader 4
	Snowdrift 2	London 3
	Succeed 2	Leviathan 1
	Stella 2	Magenta 1
	Souter Johnny . . . 1	Monarch 1
	Superb 2	Mitre 1
	The Pet. 2	Marlborough 1
	Talfourd 1	Mount Pleasant . . . 2
	Thumper 1	Ostrich 1
	The Lion 2	Philip I. 1
	Yellowball 2	Queen of Trumps . . 2
		Red Robin 1
		Stockwell 1
		Speedwell 1
		Snowdrop 1
		Transparent 1
		Tom Joiner 2
		Trumpeter 1
		Traveller 2
		Warrington 2
		Weatherproof 2
		Whinham's Industry 2
		Whitesmith 2
		Wonderful 1
		Yellowsmith 2

It was perhaps those varieties worst attacked by the mildew that dropped their leaves worst as a rule, but there were exceptions, as TABLE III. shows.

The progress of the disease was not very marked for a little time after the spraying, partly because there was nothing to attack in some cases, but as soon as growth commenced again on the defoliated shoots, the mildew again spread rapidly. A third spraying was carried out with lime-sulphur wash, having a specific gravity of 1.005, and again the effect upon the foliage was most marked. Table II. shows the varieties which lost their leaves under this spraying.

TABLE II.—EFFECT OF SPRAYING WITH LIME-SULPHUR ON
GOOSEBERRIES AT WISLEY, JULY 11, 1913.

Varieties losing many leaves.	Varieties losing some leaves.
Beauty	Australia
Champagne Red	Berry's Early Kent
Crown Bob	Bobby
Glenton Green	Careless
Golden Lion	Champagne White
Great Eastern	Clayton
Green Hedgehog	Coppice Lass
Green Walnut	Cramp
Hastenwell	Crown Bob
Highlander	Golden Gem
Lancashire Gunner	King of Trumps
Langley Beauty	Lady Haughton
Langley Gage	Leveller
Leviathan	London
Major Hibbert	London City
Rough Red	Nottingham
Slaughterman	Random Green
Speedwell	Shiner
Stella	Superb
The Lion	Talfourd
Thumper	Traveller
Yellowball	

NOTE.—Some of the varieties not named were still defoliated from the liver of sulphur spraying (compare TABLES I. and III.)

The spraying appeared to check the mildew for a short time, but not to kill the fungus completely, so that it subsequently recovered and spread still further.

TABLE III. shows a list of varieties which were not affected by the spraying either with the liver of sulphur or lime-sulphur sprays. It also shows the varieties in the collection which were least badly attacked by the mildew. No variety seems to have escaped attack completely.

TABLE III.—VARIETIES OF GOOSEBERRY UNAFFECTED BY SPRAYING WITH LIVER OF SULPHUR OR LIME-SULPHUR AT WISLEY, 1913.

Variety.	Attack of Mildew.	Variety.	Attack of Mildew.
*Alma	v. slight	Jenny Jones	bad
Bayslate Hero	„	Jenny Lind	v. „
Bollin Hall	v. „	Keen's Seedling	v. slight
British Queen	„	*King of Trumps	v.v. „
Broom Girl	„	Lancashire Lad	„
Candidate	v. „	Leader	v.v. „
*Careless	„	*Lord Scarborough	„
Catherina	v. „	*Matchless	v.v. „
Coiner	v. bad	Mitre	„
*Coppice Lass	v. „	Monarch	„
Crystal	v.v. „	Mount Pleasant	v. „
*Drill	„	*Napoléon le Grand	v. „
Duke	„	*Peru	v.v. „
Duke of Sutherland	v. „	Philip I.	„
Duster	„	*Progress	v.v. „
Eagle	v. „	Queen of Trumps	v.v. „
Early Green Hairy.	v.v. „	*Rifleman	v.v. „
Foreman	v. „	*Rosebery	v.v. „
Forester	„	Snowdrop	v. „
Freedom	„	*Stockwell	v.v. „
Garibaldi	v. „	Succeed	„
General	v.v. „	*Tom Joiner	„
*Gipsy Queen	v. „	Trumpeter	„
Goliath	„	Warrington	„
Green Laurel.	v. „	Whinham's Industry	„
Greenock	„	Whitesmith	v. „
Gretna Green	„	Wonderful	bad
High Sheriff	v. „	Yellowsmith	„
Ironmonger	v.v. „		

* These varieties dropped a few leaves.

BAXTER and SALMON† have already pointed out that 'Whinham's Industry' may be sprayed with fairly strong spraying materials under any weather conditions, whereas 'Berry's Early Kent' is far more susceptible of injury, especially when hot weather occurs during or soon after the operation. In 1912 Messrs. SALMON and WRIGHT‡ found 'Whinham's Industry,' 'Rifleman,' 'Warrington,' and 'May Duke' were uninjured by a spray twice the strength of that used at Wisley, and 'Lancashire Lad' by a spray of the same strength. 'Crown Bob' and 'Berry's Early Kent' were injured by the later

† BAXTER, D. E., and SALMON, E. S., "Spraying Experiments with the Lime-Sulphur Wash on Gooseberries," *Journal S.E. Agr. Coll.* 1911.

‡ SALMON, E. S., and WRIGHT, C. W. B., "Lime-sulphur Wash for American Gooseberry Mildew," *Journal Bd. Agr.* xix. (1913), p. 994.

sprayings, and 'Valentine's Seedling' and 'Yellow Rough' were badly damaged even by the early sprayings. Our results confirm these and were obtained in a very different season. Thus it appears unsafe to spray many varieties of gooseberries with either lime-sulphur or liver of sulphur, and neither spray proved effective in combating the disease under the conditions of the work at Wisley, although both checked it for a time. The defoliation is not only a source of loss of food-making power in the plants but it also excites the lateral buds into growth, thus further tending to weaken the bushes. Probably lime-sulphur would protect bushes from infection where it can be safely applied.

It is a pleasant duty to acknowledge the assistance of the Wisley students, especially of Messrs. J. O. PRITCHARD, C. C. TITCHMARSH, and A. N. RAWES, in carrying out the spraying and in making the observations here recorded.

The weather conditions during the spraying and after are set out in Table IV.

TABLE IV.—WEATHER CONDITIONS AT WISLEY DURING SPRAYING OPERATIONS, 1913.

Date.	Temperature.		Hours of Bright Sun-shine.	Rainfall in inches.	Date.	Temperature.		Hours of Bright Sun-shine.	Rainfall in inches.
	Max.	Min.				Max.	Min.		
May 7	55·2	34·9	4·9	·08	June 25	66·4	48·9	4·5	—
* „ 8	52·7	46·8	—	·11	„ 26	68·8	49·9	8·2	—
* „ 9	56·1	47·7	·2	·01	„ 27	65·7	50·7	9·8	—
„ 10	60·3	46·1	12·2	—	„ 28	76·2	43·3	9·5	—
„ 11	62·2	39·0	7·5	·01	„ 29	78·2	52·1	14·2	—
„ 12	58·1	43·2	—	·05	„ 30	73·0	49·0	5·2	—
„ 13	67·7	51·0	7·0	—	July 1	70·2	49·3	8·8	—
„ 14	65·2	42·0	5·9	—	„ 2	71·2	53·0	6·7	·12
„ 15	59·1	45·0	6·9	—	„ 3	66·8	55·4	4·8	—
„ 16	64·2	43·0	8·8	—	„ 4	68·9	51·0	1·1	trace
„ 17	69·6	38·2	11·1	—	„ 5	65·6	51·9	1·0	·07
„ 18	58·5	41·1	12·8	—	„ 6	62·0	50·2	1·0	·07
„ 19	57·2	37·8	10·1	·05	„ 7	62·8	48·6	4·7	—
„ 20	62·2	39·5	3·2	trace	„ 8	63·7	42·9	4·8	—
„ 21	62·7	46·8	5·7	—	„ 9	64·1	46·0	1·5	·06
„ .	„ .	„ .	„ .	„ .	„ 10	63·3	54·0	—	·03
† June 12	62·2	48·9	2·2	—	„ 11	67·1	49·8	5·7	—
„ 13	63·3	50·2	·6	—	„ 12	73·6	50·3	4·8	—
„ 14	68·3	53·4	3·8	—	„ 13	67·1	52·3	1·4	—
„ 15	76·9	52·4	13·9	—	„ 14	72·6	50·9	2·4	·72
„ 16	83·7	45·0	12·8	—	„ 15	61·1	51·8	—	·25
„ 17	82·4	53·7	9·5	—	„ 16	69·2	53·7	3·7	—
„ 18	75·2	49·8	6·1	—	„ 17	70·1	52·0	3·7	·26
„ 19	68·8	53·9	11·6	trace	„ 18	68·1	57·9	1·1	trace
„ 20	64·3	47·9	1·4	·34	„ 19	62·1	51·8	—	·09
„ 21	67·2	45·9	4·4	—	„ 20	66·9	56·5	12·8	—
„ 22	73·2	46·2	10·0	—	„ 21	63·3	45·4	·3	·01
„ 23	64·3	50·7	2·9	·02	„ 22	65·9	54·9	3·3	trace
„ 24	62·1	49·6	1·5	—					

* First spraying.

† Second spraying spread over fortnight as fruit was picked. Done only on dull days.

XVIII.—ON BEANS DAMAGED BY BEETLES.

By F. J. CHITTENDEN, F.L.S.

IN some seasons a considerable quantity of the seed of broad beans offered for sale is found to be damaged by a boring beetle (*Bruchus rufimanus*, Boh.), often wrongly called the bean weevil. The beetle is not a weevil, and as a true weevil (*Sitona lineatus*) is often found attacking the bean foliage it would be better to call this the "bean-seed beetle." The beetle is too well known to need description here. Its eggs are laid in the bean flowers or on the very young pods. The larvæ, when hatched, bore through the pod into the seed and feed there, where the beetle also hibernates. The larvæ rarely do any noticeable damage up to the time the seeds are ready for table, but during ripening burrows of a considerable size are made, though the larvæ seem to avoid piercing the testa. In spring, or earlier if the beans are stored in a warm place, the beetles emerge and the exit holes are very noticeable.

The question often arises whether the damaged seeds may be sown with a prospect of reaping a crop. It would manifestly be unwise to sow the beetles as well as the seeds, and there is unfortunately considerable danger of doing so, with the certainty that the next year's crop will be affected. It is not very difficult to destroy the beetles. The sample of seeds attacked should be placed in a vessel which can be hermetically closed. A hole should be bored in the top of the vessel. Immediately beneath it should be suspended a wide-mouthed basin. After the beans are placed in the vessel and the latter closed with the exception of the hole at the top, carbon-bisulphide is poured into the basin at the rate of 3 lb. to each one thousand cubic feet of space in the vessel and the hole immediately closed with a cork. The vessel remains closed for about forty-eight hours, when, if it has been in a warm place, the beetles will be found to be dead.

The seeds of certain varieties of beans seem always to be attacked. It is, for instance, very unusual to see a sample of 'Aquadulce' free from the pest, and this is not altogether the seedsman's fault. He may perhaps be called upon to destroy the beetles before he parts with the seed, but it is at present not infrequently beyond his power to secure seeds free from beetle attack.

Our own experience had led us to believe that seeds so attacked gave as good results as those free from the trouble. The larvæ instinctively avoid damaging the radicle and plumule of the seed in their burrowing. We have never seen either damaged by them in the broadbean. Though they consume a considerable quantity of the

reserve food stored in the cotyledons for the use of the young plant, that store is so great that a certain amount of it can be spared.

In order to test the question more exactly, equal numbers (200 of each set) of broad bean seeds were counted out, one set having been attacked by the beetles, the other being undamaged.* These were sown in boxes under similar conditions and kept side by side. As might have been expected, the damaged seeds germinated two or three days in advance of the whole ones. The holes made by the beetles admitted water more freely than the testa could, and the beans were therefore more quickly in a condition to grow. Equal percentages of the two lots germinated, and the plants first up maintained a slight lead.

Later they were planted out, and both sets attained an equal height, bore remarkably well, and were quite indistinguishable from one another.

It seems, therefore, that seeds damaged by the bean-seed beetle may be used with good hope of reaping a crop provided the beetles are first killed. The only danger is that, if the weather is cold and the seed is very long in germinating, decay may set in, for bacteria and fungi will have easy access through the wounded testa; but under normal conditions there is little to fear.

* The seeds, which were of an unknown but prolific variety, had been grown at Wisley in 1912. They were badly attacked by the beetle, but it is interesting to note that a large number of the beetles had been destroyed by an ichneumon which hatched out at the time the beetles were to be expected. Seeds which had contained perfect beetles were chosen.

VIOLAS AT WISLEY, 1913.

THREE HUNDRED AND SIXTY-EIGHT stocks of *Violas* in 276 varieties were sent in for trial, some in the autumn of 1912, the rest in the spring of 1913. All were planted in deeply-dug soil in which plenty of leaf mould had been incorporated, and all made capital growth, flowering profusely all through the hot weather of June and July and afterwards. Those planted in the autumn began flowering in February, and were not only the finest plants, but gave the best display all through the year, proving that on such a light soil as that at Wisley autumn planting gives the best results.

A list of *Violas* planted in autumn 1911 or in spring 1912 is also given. These plants stood for two seasons on the same site undisturbed with the object of testing the hardiness or otherwise of different varieties, as all *Violas* are not hardy. All are enumerated below, and it will be seen how much they vary in hardiness and vigour after standing two years. The winter of 1912-13 was very trying, as it was so wet, making it an excellent test.

A.M. = Award of Merit.

XXX = Highly Commended.

1. *Accushla* (*McKee*.—Forbes). *—See vol. xxxviii. p. 275. Height 10 inches.

2. *Admiral of the Blues* (*J. P. Robertson*.—Dobbie, Forbes, Turner), **A.M.** June 5, 1913.—A vigorous grower of free-flowering habit, with medium foliage and large violet-purple rayless flowers.

3. *Agnes* (Staward).—See vol. xxxviii. p. 275. Height 14 inches.

4. *Agnes Kay* (*Kay*.—Dickson, Dobbie), **A.M.** June 5, 1913.—A good, free-flowering variety of spreading habit, with large foliage, and big flowers having the lower and side petals white edged with pale violet-blue, while the upper petal is almost wholly violet-blue. Faintly rayed. Height 11 inches.

5. *Ailsa* (*McKnight*.—Dobbie).—A very pretty variety, with medium flowers and small foliage. The blooms are bronze-yellow, edged with a pale shade of plum-violet, upper petals lighter; rayed. Height 9 inches.

6. *Ajax* (Dickson).—See vol. xxxviii. p. 275. Height 14 inches.

7. *A. J. Rowberry* (*McLeod*.—Dickson), **A.M.** June 25, 1895.—See vol. xxxviii. p. 275. Height 1 foot.

* The names in italics in parentheses are those of the raisers, those in roman letters the names of the senders to the trials. We are deeply indebted to Mr. W. CUTHBERTSON, J.P., F.R.H.S., for drawing up this list of raisers. In some cases it has not been possible to ascertain the raiser's name.

8. *Alexandra* (*Grieve*.—Dobbie, Turner, G. Wood), **A.M.** June 5, 1913.—A vigorous grower, of nice compact habit. Flowers large, sulphury-white; rays blue; margins prettily crinkled; exceptionally free-flowering. Height 11 inches.

9. *Annie S. Frater* (*Frater*.—Dickson, Dobbie).—The flowers of this variety are rayless, large, sulphury-white in colour, and have a pretty crinkled pale violet-purple margin. The plant is a vigorous grower, with long lanceolate leaves and rather straggling habit. Height 10 inches.

10. *Arabella* (*Forbes*.—Forbes).—See vol. xxxviii. p. 275. Height 1 foot.

11. *Archie Grant* (*Downie*.—Dickson, Dobbie, Forbes, Turner), **A.M.** July 11, 1899.—See vol. xxxviii. p. 275. Height 1 foot.

12. *Ardwell Gem* (*Fraser*.—Dickson, Turner).—A strong spreading grower, with medium foliage. The flowers are rayed and are of a rich clear lemon-yellow colour. Height 10 inches.

13. *Ariel* (*Dicksons*—Forbes).—See vol. xxxviii. p. 276. Height 10 inches.

14. *Ascot* (*Staward*).—Flowers deep violet-purple, rayed, medium-sized. Habit compact and free-flowering. Height 1 foot.

16. *Aurora* (*Forbes*).—A vigorous spreading variety, with medium foliage and flowers of rich dark purple. Height 1 foot.

17. *Bertina* (*Staward*).—The flowers of this variety are of medium size, rich pansy-violet in colour, becoming bluer in the centre. Foliage large; habit vigorous. Height 1 foot.

18. *Bessie* (*Sydenham*.—Dickson, Turner), **A.M.** July 26, 1912.—See vol. xxxviii. p. 276. Height 10 inches.

19. *Bethea* (*Gold*.—Dobbie), **A.M.** June 5, 1913.—This is one of the best for bedding purposes, being of dwarf compact habit, with medium foliage. The plants produce a mass of sulphury-white rayed blooms of good form on stiff stems. Height 1 foot.

20. *Blanche* (*Sydenham*.—Forbes).—See vol. xxxviii. p. 276. Height 8 inches.

21. *Blue Bell* (*Dicksons*.—Forbes, Staward).—See vol. xxxviii. p. 276. Height 11 inches.

22. *Blue Bonnet* (*Forbes*).—See vol. xxxviii. p. 276. Height 6 inches.

23. *Blue Cloud* (*Baxter*.—Dickson, Dobbie, Turner, B. Wood).—See vol. xxxviii. p. 276. Height 8 inches.

24. *Blue Duchess* (*Dobbie*.—Dobbie, Turner), **A.M.** June 5, 1913.—A very free-flowering and attractive bedder, of nice compact habit, raised by Messrs. Dobbie. The flowers are large, pale violet, rayed. The foliage is of medium size. Height 8 inches.

25. *Blue Gown* (*Dr. Stuart*.—Dickson, Forbes), **A.M.** July 5, 1897.—See vol. xxxviii. p. 276. Height 8 inches.

26. *Bluejacket* (*Hayward*).—A variety of *V. gracilis*, of weak habit and shy in flowering. Flowers, dark bluish-violet purple, rayed. Foliage narrow. Height 6 inches.

27. Blue King (*Nicol.*—Forbes).—See vol. xxxviii. p. 276. Height 11 inches.
28. Blue Rock (*Sydenham.*—Dobbie).—See vol. xxxviii. p. 276. Height 1 foot.
29. Blue Stone (*Dicksons.*—Dickson).—See vol. xxxviii. p. 276. Height 10 inches.
30. Bridal Morn (Dickson, Turner), **A.M.** June 5, 1913.—This is probably one of the best blues yet introduced. It is a strong grower, and has large fragrant flowers of a pale violet-purple shade, becoming bluer in the centre. Height 1 foot.
31. Bridegroom (*Forbes.*—Forbes).—See vol. xxxviii. p. 276. Height 10 inches.
32. Bronze Kintore (*Dobbie.*—Dobbie, Forbes).—See vol. xxxviii. p. 277. Height 8 inches.
33. Bullion (*Dicksons.*—Dickson, Dobbie, Forbes, G. Wood), **XXX** July 5, 1898.—See vol. xxxviii. p. 277. Height 1 foot.
34. Bute (Turner).—For description see 'Bute Yellow,' with which this variety is identical. Height 1 foot.
35. Bute Yellow (Forbes).—See vol. xxxviii. p. 277. Height 1 foot.
36. Buxton Blue (G. Wood).—Habit dwarf and compact; leaves large; flowers medium, lobelia-blue, becoming steel-blue in the centre, rayed. Height 6 inches.
38. Campbell Bannerman (*Robertson.*—Forbes).—See vol. xxxviii. p. 277. Height 15 inches.
39. Cecilia (Forbes, Turner).—See vol. xxxviii. p. 277. Height 11 inches.
40. C. F. Wilson (Staward).—A pretty variety, having a good compact habit. The flowers are sulphury-white and very faintly rayed. Those on four of the six plants sent in had a suffusion of Parma violet over the ground colour. Height 10 inches.
41. Charles B. Murray (*Kay.*—Dobbie).—See vol. xxxviii. p. 277. Height 10 inches.
42. Charles Jordan (*Dobbie.*—Dobbie).—See vol. xxxviii. p. 277. Height 9 inches.
43. Charles Traill (*Forbes.*—Forbes).—See vol. xxxviii. p. 277. Height 1 foot.
44. Charlotte Chambers (*Forbes.*—Forbes).—See vol. xxxviii. p. 277. Height 10 inches.
45. Clara (Staward).—Habit compact; foliage large; flowers medium, sulphury-white, rayed with steel-blue. A free-flowering variety. Height 10 inches.
46. Colonel Plumer (*Sydenham.*—Dickson).—See vol. xxxviii. p. 277. Height 1 foot.
47. *compacta alba* (Forbes).—This is one of the miniature varieties and is of very dwarf and compact habit. The flowers are small, rayless, and of a very pale heliotrope colour. Height 7 inches.
48. Coronation (*Johnstone.*—Dobbie).—A vigorous grower, of

spreading habit, with very large leaves. Flowers very fine, deep purple in colour. The upper petals are lighter. Height 14 inches.

49. Councillor Waters (*Sydenham*.—Dickson, Dobbie, Forbes, Turner), **A.M.** July 18, 1905.—See vol. xxxviii. p. 277. Height 10 inches.

50. Countess of Hopetoun (*Downie*.—Dobbie, Forbes), **XXX** August 16, 1898.—See vol. xxxviii. p. 277. Height 10 inches.

51. Countess of Kintore (*Downie*.—Dobbie).—See vol. xxxviii. p. 277. Height 18 inches.

52. Crimson Bedder (Dickson, Dobbie).—See vol. xxxviii. p. 278. Height 10 inches.

53. Crimson King (G. Wood).—A very fine deep purple variety, with large foliage and medium flowers. Habit vigorous and spreading. Height 1 foot.

54. Cynthia (Forbes).—See vol. xxxviii. p. 278. Height 1 foot.

55. Dagon (*Grieve*.—Dobbie).—A good bronze variety, of compact habit, with medium foliage and large flowers. The centre of the bloom is very dark mahogany-brown, becoming lighter towards the margins, where traces of plum-violet are noticeable. Height 1 foot.

56. Dairymaid (B. Wood).—Habit dwarf and compact; foliage small; flowers medium, deep lavender-blue with amber-white centre, faintly rayed. The colour becomes light violet-purple with age. Height 1 foot.

57. Darkness (Hayward).—A remarkable *gracilis* hybrid, suitable for the rock garden. The flowers are very dark violet in colour, and, casually examined, appear to be almost black. The plant is a vigorous grower and flowers very abundantly. It spreads rapidly and has very narrow foliage. Height 1 foot.

58. Dobbie's White Bedder (*Dobbie*.—Dobbie).—See vol. xxxviii. p. 278. Height 9 inches.

59. Dorothy (Morter).—This is apparently identical with the variety 'Queen's Park.' Height 6 inches.

60. Duchess of Argyle (Dobbie).—A vigorous spreading variety, of free-flowering habit. Flowers medium, lower petals pale amber white with an irregular margin of rich pansy violet, which is the predominating colour of the upper petals. Rays deep blue. Height 10 inches.

61. Duchess of Cleveland (Hayward).—A charming hybrid between *V. gracilis* and *V. cornuta*. It is a very vigorous and spreading grower, and is exceptionally free-flowering. The flowers are medium in size, violet-purple shading to lavender-blue at the extremities of the petals. Suitable for the rockery. Height 1 foot.

62. Duchess of Fife (*Baxter*.—Dickson, Forbes, Turner), **XXX** August 2, 1892.—See vol. xxxviii. p. 278. Height 10 inches.

63. Duchess of Sutherland (*Downie*.—Forbes).—See vol. xxxviii. p. 278. Height 10 inches.

64. Duchess of York (Dobbie).—See vol. xxxviii. p. 278. Height 10 inches.

65. Duke of Argyle (Dobbie).—A strong-growing variety, of spreading habit, with large leaves. The flowers are large and of a rich dark purple colour, with lighter upper petals. They are borne very profusely on stiff erect stems. Height 10 inches.

66. Edina (*Taylor*.—Dobbie, Turner), **A.M.** July 26, 1912.—See vol. xxxviii. p. 278. Height 1 foot.

67. Edwin Molyneux (*Forbes*.—Forbes).—See vol. xxxviii. p. 278. Height 15 inches.

68. Elsa (Hayward).—A pretty *gracilis* hybrid, of vigorous growth and spreading habit. It is very free-flowering. The flowers, which are narrow, are of a rich pansy-violet colour, which fades away in the upper petals. Height 1 foot.

69. Eminence (*Forbes*.—Forbes).—See vol. xxxviii. p. 278. Height 1 foot.

71. Felix (Hayward).—A very charming *gracilis* hybrid, vigorous and spreading in growth. The foliage is lanceolate in shape, and the rayed flowers, which are produced very freely, are bluish violet-purple in colour. The plant is quite dwarf in habit and admirably adapted for the rock garden. Height 1 foot.

72. Flodden (*Grieve*.—Dobbie).—Habit compact and free-blooming; flowers medium, bronze edged with plum-violet. Height 11 inches.

73. Florizel (*Dr. Stuart*.—Dobbie, Forbes, G. Wood).—See vol. xxxviii. p. 278. Height 1 foot.

74. Forget-me-not (Dickson).—A small-flowered variety, of compact habit, with small foliage. The flowers are light bluish-violet, with sulphury-white centre, rayless. A shy-flowering variety. Height 10 inches.

75. Fred Williams (*Forbes*.—Forbes), **A.M.** June 5, 1913.—This variety has a nice habit of growth and medium foliage. The flowers are of good shape, flat, and of medium size. They are pale violet-purple in colour, with prettily crinkled margins. Height 6 inches.

76. General Baden-Powell (*Kay*.—Forbes).—A rather weak grower, with deep golden-yellow rayless flowers of medium size. Height 8 inches.

77. George Callan (*Johnstone*.—Dobbie).—Flowers large, rich pansy-violet, mottled with lighter shades. The plant is free-flowering and a vigorous grower, with medium foliage. Height 1 foot.

78. George C. Murray (*Kay*.—Dobbie, Forbes, Staward).—See vol. xxxviii. p. 279. Height 9 inches.

79. George Dunn (Dobbie).—The flowers of this variety are large and of a purple colour, marbled with lighter shades. They are borne on very stiff stems, and the plant is vigorous and spreading in growth. Height 1 foot.

80. George Palmer (Forbes).—See vol. xxxviii. p. 279. Height 10 inches.

81. Gertie (*Forbes*.—Forbes).—See vol. xxxviii. p. 279. Height 11 inches.

82. Glencoe (*Grieve*.—Dobbie, Forbes, G. Wood).—A weak grower

and a shy bloomer, with small foliage. The flowers are a rich bronze, shading off to yellow-lake towards the margins. Height 11 inches.

83. Glow (*Dicksons*.—Dickson).—See vol. xxxviii. p. 279. Height 10 inches.

84. Golden Fleece (Wallace).—A pretty variety of *V. gracilis*, having pale primrose-yellow flowers, rayed with brown. The lower petal is a little deeper in colour. Height 6 inches.

85. Goldfinch (*Baxter*.—Dobbie).—A Pansy of vigorous growth, with big lanceolate leaves and deep chestnut-brown flowers, edged with golden yellow. Height 1 foot.

86. Goldfinder (Staward).—A strong straggling grower, with medium deep clear yellow-rayed flowers. Free-flowering in habit. Height 1 foot.

87. Gondolier (Hayward).—A charming free-flowering hybrid between *V. gracilis* and *V. cornuta*. The leaves are ovate, and the plant is a strong and spreading grower. The flowers, which are larger and rounder than those of *V. cornuta*, are amber-white and rayless, while the lower petal is tinged with chrome-yellow. Height 8 inches.

88. Grace (Staward).—Habit neat and compact, with medium foliage. Flowers sulphury-white, rayless, upper petals suffused with very pale ageratum blue. Height 11 inches.

89. *gracilis* (Wallace), **A.M.** March 31, 1908.—A remarkably pretty dwarf species, producing an abundance of deep purple blossoms in dense tufts. The spur of the flower is somewhat curved and is about as long as the corolla. The leaves are linear lanceolate and acute. The plant, which is a native of Mount Olympus, grows about 4 inches high, and commences to bloom early in the spring and continues for a long period. Height 8 inches.

90. Grievei (*Grieve*.—Dobbie).—A variety of strong and spreading habit, with medium foliage and flowers. Colour yellow, rayed. Height 1 foot.

91. Grievei Improved (*Grieve*.—G. Wood).—Similar to the preceding.

92. Grove Lodge (Turner).—Habit compact, dwarf and free flowering. Flowers medium, light violet-purple, paler in the centre, rayless. Height 10 inches.

93. Harry Hamilton (Turner).—This variety is very similar to 'Kate Cochrane,' but the flowers are somewhat smaller. Colour dark purple, shading off almost to white in the upper petals. Height 1 foot.

94. Hector MacDonald (Dickson, Dobbie).—See vol. xxxviii. p. 279. Height 10 inches.

96. Holyrood (*Dicksons*.—Forbes).—See vol. xxxviii. p. 279. Height 11 inches.

97. Hugh Reid (*Johnstone*.—Dobbie).—A very pretty flower, of large size. Colour deep purple, shading to pale violet-rose in the upper petals. Habit strong and spreading; foliage medium; flower stems very stiff and erect. Height 16 inches.

98. Iris (Hayward).—A charming *gracilis* hybrid of strong growth,

with violet-purple flowers, fading almost to white in the upper petals and at the tips of the side petals. Height 8 inches.

99. Isolde (Dobbie).—**A.M.** July 18, 1905.—Habit very vigorous and free-flowering; growth tall; leaves medium; flowers medium, rayless, deep golden yellow. Height 16 inches.

100. Ithuriel (Dobbie, Turner).—See vol. xxxviii. p. 279. Height 1 foot.

101. Ivanhoe (*Forbes*.—Forbes).—See vol. xxxviii. p. 279. Height 14 inches.

102. Jackanapes (Forbes), **A.M.** July 11, 1899.—Flowers deep yellow, rayed, upper petals chestnut-brown, very pretty. The plant is not a strong grower. Height 9 inches.

103. James C. Erskine (Forbes).—See vol. xxxviii. p. 279. Height 7 inches.

104. James M. Grier (*McFadyen*.—Dobbie).—A large-flowered variety, of strong growing habit. Colour deep violet-purple, shading off to ageratum-blue at the margins of the petals. Height 8 inches.

105. James Pilling (Forbes, Turner, G. Wood).—See vol. xxxviii. p. 279. Height 10 inches.

106. J. B. Riding (*McLeod*.—Dickson, Forbes, Turner), **A.M.** July 11, 1899.—See vol. xxxviii. p. 279. Height 13 inches.

107. Jean Craik (Dickson).—See vol. xxxviii. p. 279. Height 1 foot.

108. Jenny Houston (Dobbie).—See vol. xxxviii. p. 280. Height 9 inches.

109. Jenny M'Call (*Dobbie*.—Dobbie).—A strong grower, with medium foliage and large flowers of a rich dark purple colour. The upper petals shade off to pale violet-purple, and the plant is very free-flowering in habit. Height 14 inches.

110. Jenny McGregor (*Kay*.—Dobbie).—Habit straggling, flowers medium, rayless, rich pansy-violet, shading off to light bluish-violet at the margins, especially in the upper petals. Height 11 inches.

111. Jessie (Morter).—This is a seedling from 'J. Pilling,' of nice compact habit, with medium foliage. The flowers are medium in size, amber-white, suffused with pale violet-purple, more especially in the upper petals. Height 10 inches.

112. Jessie Baker (*Bakers*.—Turner).—A strong grower, with medium foliage and free-flowering habit. Flowers medium, sulphury-white edged with violet-purple, rayless, of good form. Height 13 inches.

113. Mrs. J. H. Rowland (Turner).—Growth strong, habit compact, flowers large, pale magenta, lightly rayed; foliage small. Height 1 foot.

114. J. H. Watson (Dobbie).—The flowers of this variety are large, rich deep purple, mottled with lighter shades. A strong grower, of free-flowering habit. Height 11 inches.

115. Joan (Staward).—Flowers sulphury-white, rayed; upper petals suffused with very pale violet-purple, lower petals edged with

the same. Habit compact, growth strong, foliage medium. Height 1 foot.

116. John (Staward).—A free-flowering variety with medium-sized rich dark purple flowers. Habit compact, foliage medium. Height 1 foot.

117. John Cunningham (*Dobbie*.—*Dobbie*).—A rayless variety having a pale heliotrope ground, suffused with rich pansy-violet. Habit weak and straggling. Height 14 inches.

118. John Forbes (*Forbes*.—*Forbes*).—See vol. xxxviii. p. 280. Height 1 foot.

120. John Quarton (Dickson, Forbes, Turner), *A.M.* July 26, 1912.—See vol. xxxviii. p. 280. Height 10 inches.

121. John Young (Forbes).—Habit compact, with large leaves. Flowers large, faintly rayed, violet-purple. This is not a free-flowering variety. Height 8 inches.

122. Jubilee (*Dobbie*), *A.M.* July 26, 1912.—See vol. xxxviii. p. 280. Height 16 inches.

123. Kate Blyth (Dickson).—See vol. xxxviii. p. 280. Height 10 inches.

124. Kate Cochrane (*Dobbie*).—See vol. xxxviii. p. 280. Height 13 inches.

125. Katie (Staward).—A vigorous grower, with medium foliage and free-flowering habit. Flowers pale sulphur-yellow, lower petals golden yellow, faintly rayed with pale aniline-blue. Stock mixed. Height 13 inches.

126. Kingcup (*Sydenham*.—Dickson, *Dobbie*, Forbes, Turner, G. Wood), *A.M.* July 26, 1912.—See vol. xxxviii. p. 280. Height 13 inches.

127. Kitty Bell (Dickson, *Dobbie*, Forbes).—See vol. xxxviii. p. 280. Height 14 inches.

128. Klondyke (*Dr. Dickson*.—*Dobbie*).—See vol. xxxviii. p. 280. Height 13 inches.

129. Lady Clonbrook (B. Wood).—A strong grower, of compact and very free-flowering habit. Foliage small; flowers medium, vinous mauve, becoming lighter in the centre, faintly rayed. Height 15 inches.

130. Lady Grant (*Frater*.—Dickson, *Dobbie*, Forbes).—See vol. xxxviii. p. 280. Height 13 inches.

131. Lady Knox (*Frater*.—*Dobbie*).—This variety is tall and vigorous, with medium lanceolate leaves and a very free-flowering habit. Flowers large, rayless, clear primrose-yellow; very pretty. Height 14 inches.

132. Lady of the Snows (*Robertson*.—Forbes).—See vol. xxxviii. p. 280. Height 10 inches.

133. Lark (*Sydenham*.—Dickson, *Dobbie*).—See vol. xxxviii. p. 280. Height 11 inches.

134. Larn (Staward).—A free-flowering variety, of vigorous spreading habit, with large foliage. The flowers are large, pale

sulphury-white, suffused in the upper petals with ageratum-blue; rayless. Height 1 foot.

135. Lawmuir (*McFadyen*.—Dobbie).—The flowers of this variety are large, purple, rayed, and the plant is a vigorous and spreading grower, with lanceolate leaves. Height 15 inches.

136. Lilacina (*Dicksons*.—Dobbie).—See vol. xxxviii. p. 281. Height 1 foot.

137. Lilian (*Forbes*.—Forbes).—See vol. xxxviii. p. 281. Height 9 inches.

138. Lizzie Paul (Dickson).—See vol. xxxviii. p. 281. Height 10 inches.

139. Lodge House No. 1 (Woods).—An exceptionally free-flowering variety, bearing medium-sized flowers on stiff stems. The colour is pale ageratum-blue, with heavy steel-blue rays. The plant is a vigorous and spreading grower, with large foliage. Height 14 inches.

140. Lodge House No. 2 (Woods).—A strong grower, of nice compact habit and medium foliage. Flowers large, rich pansy-violet, abundantly produced. Height 14 inches.

141. Lodge House No. 3 (Woods).—Flowers pale sulphur-yellow, rayless, small; foliage small; habit strong and spreading, free-flowering. Height 10 inches.

142. Lodge House No. 4 (Woods).—This variety was weak in growth and bore medium flowers of a violet-purple colour, with bluish-violet centre, faintly rayed. Height 8 inches.

143. Lodge House White (Woods).—A compact grower, of good constitution. Flowers and foliage medium in size; colour pure white, rayless; very free-flowering. Height 8 inches.

144. Lord Elcho (Turner).—A compact grower, with medium foliage and small primrose-yellow rayless flowers. Height 6 inches.

145. Lord Shaw (*G. Wood*.—Dobbie, *G. Wood*).—A compact and strong grower, with fairly large foliage and violet-purple, rayed flowers of good size, which are borne profusely. Height 11 inches.

146. Lottie McNeil (Turner).—A free-flowering variety, of nice compact habit, with medium lilac-mauve, rayless flowers borne on erect stiff stems. Somewhat like the variety 'Florizel.' Height 9 inches.

147. Lucy Franklin (Turner).—The growth of this variety is rather straggling, but it has a strong constitution. The foliage is large and the flowers are rayless, amber-white in colour, with a buttercup-yellow lower petal. Height 15 inches.

148. Lyric (Forbes).—See vol. xxxviii. p. 281. Height 9 inches.

149. Maggie (Staward).—A sulphury-white rayless variety, of medium size. Habit strong, spreading and free-flowering. Height 14 inches.

150. Maggie Currie (Dickson, Dobbie).—See vol. xxxviii. p. 281. Height 11 inches.

151. Maggie Mott (*Burdett*.—Dickson, Dobbie, Turner, *G. Wood*), **A.M.** July 26, 1912.—See vol. xxxviii. p. 281. Height 15 inches.

152. Maid of Lorn (Dickson).—See vol. xxxviii. p. 281. Height 9 inches.

153. Marchioness (*Irvine*.—Dobbie, B. Wood, G. Wood).—See vol. xxxviii. p. 281. **A.M.** July 27, 1898. Height 14 inches.

154. Margaret Lord (Staward).—A vigorous grower, of spreading habit, bearing deep golden-yellow rayless flowers of medium size. The foliage is large and lanceolate in shape. Height 1 foot.

155. Margaret Wood (*Grieve*.—G. Wood).—A rich chrome-yellow rayless variety, becoming gamboge-yellow in the centre. The flowers and foliage are medium in size, and the habit of the plant is vigorous and spreading. Height 16 inches.

156. Marion Waters (Staward).—This variety is strong and spreading in growth, with medium foliage and pretty pale violet-purple flowers of medium size, which are rayed. The stock contained one rogue bearing large sulphury-white flowers. Height 10 inches.

157. Marjorie (Morter).—A vigorous variety, with large foliage and very pale sulphur-yellow rayless flowers of good size and having crinkled margins. Height 14 inches.

158. Marjorie (Wallace).—A variety of *gracilis* with pale sulphur-yellow flowers rayed with violet. The blooms are smaller than those of the type. Height 6 inches.

159. Mars (*Grieve*.—Dobbie).—This variety is compact in growth and has small leaves. The flowers, which are not produced very freely, are medium in size and bronze in colour, being very deep in the centre and shading off to gamboge-yellow. Height 9 inches.

160. Mary Burnie (*Dobbie*.—Dobbie, Forbes).—See vol. xxxviii. p. 281. Height 9 inches.

161. Masterpiece (B. Wood).—The flowers of this variety are of medium size, chrome-yellow, blotched on the three lower petals with brown, raved. Height 10 inches.

162. Mauve Queen (*Dobbie*.—Dixon, Dobbie).—See vol. xxxviii. p. 282. Height 14 inches.

163. May (Staward).—A spreading grower, of strong constitution. Flowers amber-white, suffused with heliotrope, rayed, lower petals tinged with deep golden yellow; size medium. Height 10 inches.

164. Mina (*Turner*.—Turner).—The flowers of this variety are small, amber-white, slightly rayed and very freely produced. The plant is a vigorous grower, with medium foliage. Height 14 inches.

165. Minnie J. Ollar (*Ollar*.—Dobbie).—This variety did not make strong growth. Foliage medium, flowers small, primrose-yellow, edged with bright violet-purple; rayed with purple. Height 7 inches.

166. Miranda (Staward).—A strong upright grower, with large foliage and flowers. The latter are very fine in form, rayless, white, tinged at the margins with pale violet-purple, especially in the upper petals. Height 1 foot.

167. Miss Airdrie (G. Wood).—Flowers medium, primrose-yellow, rayless. Foliage medium. Habit vigorous, spreading, and very free-flowering. Height 14 inches.

168. Miss Anna Callan (*Johnstone*.—Dobbie, Turner).—The flowers are amber-white, heavily shaded with bluish-violet and rayed. Messrs. Dobbie's stock was of very compact and tufted growth, with small ovate leaves and few flowers, but the other stock was of normal growth and flowered freely. The compact grower was 8 inches high, while the other was 1 foot high.

169. Miss Michie (*Forbes*.—Forbes).—See vol. xxxviii. p. 282. Height 9 inches.

170. Molly Pope (Dickson).—See vol. xxxviii. p. 282. Height 9 inches.

171. Moseley Perfection (*Bostock*.—Dobbie, Turner), **A.M.** May 9, 1911.—See vol. xxxviii. p. 282. Height 15 inches.

172. Mrs. A. Hervey (*Dobbie*.—Dickson, Dobbie).—A tall grower, with medium foliage. The flowers are medium in size, rayless, white, having the edges and often much of the upper petals mottled with rich pansy-violet. The flower stems are very stiff and erect, and the plant is very free-flowering in habit. Height 13 inches.

173. Mrs. Allsop (*Forbes*.—Forbes).—See vol. xxxviii. p. 282. Height 10 inches.

174. Mrs. B. K. Mitchell (Dickson).—A compact grower, with small foliage and rich pansy-violet flowers of small size, having the centre amber-white and rayed. Height 9 inches.

175. Mrs. C. B. Douglas (Dickson, Dobbie).—See vol. xxxviii. p. 282. Height 11 inches.

176. Mrs. C. F. Gordon (Forbes, Turner).—See vol. xxxviii. p. 282. Height 10 inches.

177. Mrs. Charles Turner (Dobbie), **XXX** July 4, 1893.—See vol. xxxviii. p. 282. Height 1 foot.

178. Mrs. Chichester (*Sydenham*.—Dickson, Dobbie, Forbes, Turner), **A.M.** July 26, 1912.—See vol. xxxviii. p. 282. Height 14 inches.

180. Mrs. Currie (Staward).—The flowers of this variety are rayless and primrose-yellow in colour. The plants have a vigorous, spreading and free-flowering habit, with medium foliage. Height 13 inches.

181. Mrs. Davidson (*Forbes*.—Forbes), **A.M.** July 26, 1912.—See vol. xxxviii. p. 282. Height 1 foot.

182. Mrs. D. M. McKinnon (*Forbes*.—Forbes).—This variety grew very weakly, and produced very small rayless flowers of a pale violet-purple shade. Height 6 inches.

183. Mrs. Dundas (Dobbie).—The flowers of this variety are large and of a rich pansy-violet colour. The plant is a vigorous grower, of spreading habit, and having medium foliage. It has a good constitution and produces its flowers in great profusion. Height 15 inches.

184. Mrs. E. Turnbull (*Dobbie*.—Dobbie).—A vigorous variety, with medium foliage and flowers. The latter are of good form and are of a very dark purp'e colour, nearly black, with lighter margins. This was the darkest Viola in the trial. Height 9 inches.

185. Mrs. Geo. Wood (*G Wood*.—G. Wood).—A charming variety, of strong constitution and spreading habit, with medium foliage. It

is exceptionally free-flowering, and bears bright violet-purple flowers of medium size, faintly rayed. Height 15 inches.

186. Mrs. H. Hamilton (*Dobbie*.—*Dobbie*).—A strong grower, with lanceolate leaves. The flowers are of good form and medium size, sulphury-white in colour, edged with violet-purple, which is suffused through the upper petals; rayless. A very free-flowering variety. Height 1 foot.

187. Mrs. Hopkirk (*Grier*).—A variety of straggling habit, with medium sulphury-white flowers, rayed with deep purple. Height 9 inches.

188. Mrs. J. Sweeney (*Dobbie*).—A strong grower, of spreading habit, with large rayless flowers, which are deep purple in the centre, getting lighter towards the margins, where light ageratum-blue is the prevailing colour. Height 14 inches.

189. Mrs. McPhail (*Dickson*).—Flowers large, pale ageratum-blue, rayed; foliage medium; habit strong and compact. Height 10 inches.

190. Mrs. Norris-Elye (*Dobbie*.—*Dobbie*).—See vol. xxxviii. p. 283. Height 14 inches.

191. Mrs. Pat (*Robertson*.—*Forbes*).—See vol. xxxviii. p. 283. Height 1 foot.

192. Mrs. R. A. Boden (*Forbes*.—*Forbes*).—A weak grower, with medium foliage and golden-yellow rayless flowers. Height 1 foot.

193. Mrs. R. Jones (*Forbes*.—*Forbes*).—Flowers medium, very light bluish-violet, rayless; habit straggling; not a strong grower. Height 9 inches.

194. Mrs. Scott Elliot (*Forbes*.—*Forbes*).—See vol. xxxviii. p. 283. Height 10 inches.

195. Mrs. T. W. R. Johnston (*Johnstone*.—*Dickson*, *Forbes*).—See vol. xxxviii. p. 283. Height 10 inches.

196. Mrs. Watt-Black (*Watt-Black*).—A strong-growing variety, of spreading habit, with medium foliage and flowers. Colour bright primrose-yellow, edged with pale heliotrope, which is also much suffused through the upper petals, rayed. Height 1 foot.

197. Mrs. W. Greenwood (*Dickson*).—This variety has medium-sized rayless flowers of rich chrome-yellow. The habit is strong and spreading, with medium foliage. Height 10 inches.

198. Muriel (*B. Wood*).—A vigorous grower, with strong constitution and compact habit. The foliage and flowers are large. The latter are of excellent form; sulphury-white, edged with bluish-violet, which predominates in the two upper petals; slightly rayed. Height 1 foot.

199. Nellie (*Sydenham*.—*Dickson*).—See vol. xxxviii. p. 284. Height 1 foot.

200. Nellie Chapman (*Dobbie*.—*Dobbie*).—See vol. xxxviii. p. 284. Height 14 inches.

201. Nettie Macfadyen (*Dobbie*).—Flowers dark purple, with lighter upper petal, rather small. Habit spreading, growth strong. Height 1 foot.

202. Nora Marrows (Dobbie).—A vigorous grower, with lanceolate leaves and medium-sized rayed flowers, borne on very stiff stems. The colour is very pale lilac-mauve, which turns almost white with age. Height 1 foot.

204. Ophelia (Sydenham.—Dobbie).—See vol. xxxviii. p. 284. Height 1 foot.

205. Orange (Grieve.—Dobbie).—A variety of nice compact habit, with medium foliage. Flowers small, neat, rayed, rich bronze in the centre, shading to gamboge-yellow towards the margins, where a faint tint of plum-violet occurs. Height 11 inches.

206. Oriflamme (Dicksons.—Forbes).—A bronze variety, with medium-sized rayed flowers. The plant is a weak grower. Height 9 inches.

207. Oswald (Staward).—A strong grower, having medium foliage. The flowers are identical with those of 'Bethea,' being pale sulphur-yellow, rayed with steel-blue. Height 1 foot.

208. Panshanger White (Staward).—Habit spreading, growth strong; flowers medium, palest sulphury-white, rayless. Foliage medium. Height 14 inches.

209. Panshanger Yellow (Staward).—A dwarf compact variety, with medium foliage and deep golden yellow rayless flowers, which are borne abundantly. Height 10 inches.

210. P. A. Smith (Dickson).—See vol. xxxviii. p. 284. Height 8 inches.

211. Pembroke (Sydenham.—Dickson, Forbes).—See vol. xxxviii. p. 284. Height 10 inches.

212. Pencaitland (Dr. Dickson.—Dobbie), **A.M.** July 11, 1899.—See vol. xxxviii. p. 284. Height 1 foot.

213. Perdita (Forbes.—Forbes).—See vol. xxxviii. p. 284. Height 1 foot.

214. President (Forbes.—Forbes).—A rich dark claret-coloured variety of medium size, with medium foliage. Height 1 foot.

215. Primrose (Forbes.—Forbes).—See vol. xxxviii. p. 284. Height 1 foot.

216. Primrose Dame (Sydenham.—B. Wood).—Flowers medium, primrose yellow; growth strong and spreading, foliage medium. Height 14 inches.

217. Primrose Girl (Hayward).—A *gracilis* hybrid of great vigour with pale sulphur-yellow flowers, rayed with steel-blue and tinged with pale bluish-violet, with which colour the whole flower eventually becomes suffused. The blooms are larger than those of the type, and the plant is especially suitable for the rockery. Height 8 inches.

218. Princess May (Forbes).—See vol. xxxviii. p. 284. Height 8 inches.

219. Purity (Forbes.—Dobbie, Forbes, Turner), **A.M.** June 5, 1913.—This useful Viola was raised by Forbes. It has large, rayless, white flowers of great value for bedding. It is very free-flowering, and is strong in growth and spreading in habit. Height 13 inches.

220. Purple Robe (Wallace).—A large deep violet-purple form of *V. gracilis*. It is about twice the size of the type as grown in the trial, and is of exceptionally vigorous and free-flowering habit. The large masses of bloom which it forms would be very effective in the rock garden, for which the plant is admirably adapted. Height 16 inches.

221. Queen of the Whites (Dickson).—A vigorous upright grower, with medium foliage. The flowers are of average size, rayless, and pale sulphury-white in colour. Height 10 inches.

222. Queen of the Year (Dickson, Forbes).—See vol. xxxviii. p. 284. Height 8 inches.

223. Queen's Park (Morter).—A good, deep, clear golden-yellow variety, having medium flowers and large foliage. The plant is of nice, compact habit. Height 7 inches.

224. Redbraes Bronze (*Grieve*.—Dobbie), **A.M.** June 5, 1912.—This is undoubtedly the best of the mahogany or bronze-coloured section. The flowers are of medium size and of a deep mahogany-brown colour, becoming lighter in the upper petals and having a distinct plum-violet margin. It is a good strong grower and is very free-flowering. Height 11 inches.

225. Redbraes White (*Grieve*.—Dobbie), **A.M.** June 5, 1913.—A useful bedder, of large size, and very pale greenish-white in colour. Very free-flowering, compact, and strong in growth. Height 1 foot.

226. Redbraes Yellow (*Grieve*.—Dobbie, Turner, G. Wood), **A.M.** June 5, 1913.—An excellent variety in every way. It is a strong grower, compact, and free-flowering in habit. Flowers deep golden yellow, rayless. Useful for bedding. This and the two preceding varieties were raised by Mr. James Grieve. The stock sent by Mr. Turner was considered to be identical with 'Kingcup.' Height 1 foot.

227. Red Crown (Hayward).—A very pretty hybrid variety, resembling *V. gracilis* in form and size of flower. It is a vigorous grower, of spreading and very free-flowering habit. The flowers are pale sulphur-yellow, rayed with steel-blue, and the upper petals are rich pansy-violet except at the base and margins. Height 15 inches.

228. Reginald (Staward).—A compact grower, with medium-sized ovate leaves. The flowers are sulphury-white, rayless, and have a violet-purple margin. Height 1 foot.

229. Rev. William Young (Grier).—Flowers very large, rich dark purple, very freely produced. Habit compact, vigorous; foliage large. Height 9 inches.

230. Rev. William Young Improved (Grier).—The flowers of this variety are of very fine form and are borne on very stiff stems. Colour rich pansy-violet; habit similar to that of the preceding. Height 1 foot.

231. Robert Barnet (Forbes).—A vigorous spreading variety, with large leaves and flowers. Colour amber-white, with violet-purple and deep chestnut-brown centre. Height 10 inches.

232. Robert Davidson (Staward).—A deep violet-purple variety,

becoming bluer in the centre. The flowers are rayless and of average size. The growth of the plant is strong and straggling. Stock not quite true. Height 16 inches.

233. Rolph (*Sydenham*.—Forbes).—See vol. xxxviii. p. 285. Height 14 inches.

234. Rosy Morn (B. Wood).—A compact grower, having a strong constitution and medium foliage. The flowers are large and are borne on long stems. The colour is a rich pansy-violet. Height 14 inches.

235. Royal Scot (*Grieve*.—Dickson, Dobbie), **A.M.** June 5, 1913.—An excellent variety, raised by Mr. James Grieve. The flowers are of medium size and are deep violet-purple in colour. The plant is a strong, compact grower, of free-flowering habit, suitable for bedding. Height 10 inches.

236. Royal Sovereign (*Stark*.—Dickson, Dobbie, Forbes, Turner), **A.M.** July 18, 1905.—See vol. xxxviii. p. 285. Height 13 inches.

237. Rubella (Hayward).—The habit and foliage of this charming rock-garden variety are like those of *V. gracilis*, but the flowers are fuller and more round in the petals. Colour dark purple; diameter of flower about 1 inch. Height 8 inches.

238. Sir Henry (Staward).—A strong grower, with medium foliage and large, sulphury-white, rayed flowers. Too much like 'Alexandra' to be called distinct. Height 14 inches.

239. Sir Herbert (Staward).—A variety of good, compact habit, with medium foliage. The flowers, which are borne very freely, are pale sulphur-yellow and slightly rayed, while the whole is surrounded by a deep edge of rich pansy-violet, which colour also predominates in the two upper petals. Height 1 foot.

240. Sir Robert Pullar (*Forbes*.—Forbes).—See vol. xxxviii. p. 285. Height 9 inches.

241. Skipjack (*Sydenham*.—Forbes).—Flowers large, violet-purple, curiously marbled with varying shades of bronze. Foliage medium. Height 9 inches.

242. Skylark (*Baxter*.—Turner).—The plant is of nice, compact habit, and bears sulphury-white flowers of medium size, rayed with steel-blue. The upper petals are edged with blue. One plant of 'Mrs. C. F. Gordon' appeared in this stock. Height 9 inches.

243. Small White (Turner).—A vigorous spreading grower, of dwarf habit, with small foliage. The flowers are small, not more than 1½ inch across, rayless, milk-white, with chrome-yellow centre. They are borne in great profusion. Height 10 inches.

244. Snowdrift (Hayward).—A very pretty variety of the *gracilis* type. The flowers are sulphury-white, with blotches of bright violet-purple on the three lower petals; rayed; with age the whole of the flower becomes suffused with aniline-blue. The plant is of straggling habit. Height 9 inches.

245. Snowflake (*Forbes*.—Dobbie, Forbes), **A.M.** July 26, 1912.—See vol. xxxviii. p. 285. Height 15 inches.

246. *Viola Stirling* (*Kay.*—*Dobbie*).—Growth strong; foliage medium; flowers borne on long stalks, large, amber-white, deepening to pale sulphur in the lower petal, prettily edged with violet-purple, which colour is suffused through the upper petals; rays violet-purple. Height 14 inches.

247. *Sulphurea* (*J. Grieve.*—*Dobbie*), **A.M.** June 5, 1913.—This is undoubtedly one of the best bedders we have. It is of dwarf and compact habit, with medium foliage. The flowers are also of medium size and of a lovely pale sulphur-yellow colour, deepening in the lower petal, where it approaches primrose-yellow. They are rayless and have crinkled margins. One of the most striking features of this variety is the exceptional freedom with which it blooms. All the plants carried on an average well over forty flowers and buds. The period of flowering extends over a very long season. Height 7 inches.

249. *Sunshine* (*Turner*).—A deep golden-yellow, rayless variety, of medium size. The plant is a strong grower, free-flowering, and has a nice habit. Height 1 foot.

250. *Swan* (*Sydenham.*—*G. Wood*).—A large-flowered, pure white rayless variety, having a compact and free-flowering habit and large leaves. Height 14 inches.

251. *Sydney* (*Sydenham.*—*Forbes*).—Flowers medium, chrome-yellow in colour. Foliage medium. Height 10 inches.

252. *The Mearns* (*Dicksons.*—*Forbes*), **XXX** August 5, 1891.—See vol. xxxviii. p. 285. Height 1 foot.

253. *The Tweed* (*Grieve.*—*G. Wood*).—Growth compact, vigorous upright, with medium foliage. The flowers are palest sulphury-white and rayless. They are borne in great abundance. Height 13 inches.

254. *Thomas Bell* (*Forbes.*—*Forbes*).—See vol. xxxviii. p. 286. Height 1 foot.

256. *True Blue* (*Dean.*—*Dobbie*, *Forbes*).—See vol. xxxviii. p. 286. Height 9 inches.

258. *Unnamed seedling* (*Leslie*).—A strong grower, with large foliage and dark purple rayless flowers having an amber-white centre. Height 1 foot.

259. *Violetta* (*Dr. Stuart.*—*Forbes*).—See vol. xxxviii. p. 286. Height 9 inches.

260. *Virgin White* (*Todd.*—*Dickson*, *Dobbie*), **A.M.** June 5, 1913.—A strong grower, of spreading habit, with medium-sized pale sulphury-white rayless flowers, borne on long stalks. The plant is exceptionally free-flowering. Height 15 inches.

261. *Walter Welsh* (*Dicksons.*—*Dobbie*, *Turner*), **A.M.** July 26, 1912.—See vol. xxxviii. p. 286. Height 14 inches.

262. *Waverley* (*Dicksons.*—*Dobbie*).—See vol. xxxviii. p. 286. Height 1 foot.

263. *White Beauty* (*Dickson*).—See vol. xxxviii. p. 286. Height 8 inches.

264. *White Duchess* (*Baxter.*—*Dobbie*).—See vol. xxxviii. p. 286. Height 1 foot.

265. White Empress (Dobbie).—See vol. xxxviii. p. 286. Height 9 inches.

266. White Swan (Turner).—This variety is similar to that grown in the trial as 'Swan.'

267. W. H. Woodgate (*Forbes*.—Forbes), **A.M.** July 26, 1912.—See vol. xxxviii. p. 286. Height 1 foot.

268. William Daniels (*Forbes*.—Forbes).—See vol. xxxviii. p. 286. Height 1 foot.

269. William Hamilton (*Dobbie*.—Forbes).—See vol. xxxviii. p. 286. Height 1 foot.

270. William Neil (Dickson, Dobbie, Forbes, Turner), **A.M.** July 5, 1897.—See vol. xxxviii. p. 286. Height 1 foot.

271. William Robb (*Forbes*.—Forbes).—See vol. xxxviii. p. 286. Height 16 inches.

272. Willie Farmer (*Ollar*.—Dobbie).—See vol. xxxviii. p. 287. Height 14 inches.

273. Woodcock (Dobbie).—See vol. xxxviii. p. 287. Height 6 inches.

274. W. P. A. Smyth (Dobbie).—A very vigorous grower, of free-flowering habit. The flowers are of nice form, medium size, pale amber-white colour, with a very faint tint of heliotrope at the margins. Rays blue. Height 14 inches.

275. Yellow Beauty (Dickson).—A compact grower, bearing small, deep golden-yellow flowers, faintly rayed. Height 8 inches.

* * * * *

The following Pansies were also sent in :—

15. Attraction (Dobbie).—A Pansy of weak, straggling habit. Flowers large, deep velvety purple, margined with pale yellow and tinged with plum-violet. Height 9 inches.

37. Caledonia (Dobbie).—A Pansy of vigorous habit, with large foliage and dark chestnut-brown flowers, tinged with purple and edged with bright yellow. The upper petals are mostly yellow. Height 10 inches.

70. Emmie Bateman (Dobbie).—A Pansy of straggling habit, with dark purple flowers edged with sulphur-yellow, deepening to chrome-yellow in the lower petals. Stems weak. Height 10 inches.

85. Goldfinch (*Baxter*.—Dobbie).—A Pansy of vigorous growth, with big lanceolate leaves and deep chestnut-brown flowers, edged with golden yellow. Height 1 foot.

95. Holroyd Paul (Dobbie).—A very showy Pansy, of vigorous spreading habit. Flowers large, very dark purple, edged with yellow and plum-violet. Height 10 inches.

119. John Picken (Dobbie).—A strong-growing Pansy with large foliage. Flowers deep brown, tinged with purple and edged with yellow and plum-violet. Height 9 inches.

179. Mrs. C. Kay (Dobbie).—A Pansy of compact and free-flowering habit, with large foliage and flowers. The latter are bluish-purple, edged with slate-violet. Height 9 inches.

203. Nurse Young (Dobbie).—A Pansy of good form and vigorous habit. The flowers are of a rich bronze colour, tinged with purple and margined with pale yellow. Height 10 inches.

248. Sunburst (Dobbie).—A large-flowered Pansy of compact habit, with large foliage. It is a shy bloomer and the three lower petals are dark mahogany-edged with chrome-yellow white; the upper petals are streaked and tinged with shades of violet-purple. Height 8 inches.

255. Tom Christie (Dobbie).—A strong-growing Pansy, with deep chestnut-brown flowers, having the edges tinged with plum-violet. Height 10 inches.

257. Unicorn (Dobbie).—A Pansy of vigorous habit, with medium-sized purplish-brown flowers, edged with lemon-yellow. Height 11 inches.

276. Zulu (Dobbie).—A Pansy of straggling growth. The centre of the flower is almost black, with yellow streaks, while the margins are plum-violet. Height 1 foot.

RELATIVE HARDINESS OF VIOLAS.

LIST of Violas showing the percentage of plants standing after two seasons on the same site.

Accushla	100	Bradley's Seedling	33
Admiral of the Blues	41	Bridal Morn	83
Agnes Kay	58	Bridegroom	83
Ajax	66	Bronze Kintore	16
A. J. Rowberry	100	Bullion	91
Alpha and Omega	31	Bute Yellow	100
Arabella	100	Campbell Bannerman	83
Archie Grant	96	C. B. Murray	0
Ariel	66	Cecilia	66
Bessie	16	Charles Jordan	0
Blanche	100	Charles Traill	100
Blue Bell	100	Charlotte Chambers	100
Blue Bird	33	Christiana	100
Blue Bonnet	66	Colonel Plumer	83
Blue Cloud	100	<i>cornuta</i>	100
Blue Duchess	83	Councillor Waters	83
Blue Gown	100	Countess of Hopetoun	33
Blue King	83	Countess of Kintore	66
Blue Rock	66	Crieffie Smith	0
Blue Stone	100	Crimson Bedder	100
Bradley's Seedling No. 8	66	Cynthia	83
Bradley's Seedling No. 17	100	Darkey	50

Dawn	100	Maggie Currie	100
Dobbie's White Bedder	100	Maggie Mott	94
Duchess of Fife	100	Maid of Lorn	100
Duchess of Sutherland	100	Marchioness	83
Duchess of York	66	Marginata	100
Edina	83	Mary Burnie	83
Edward Molyneux	50	Mauve Queen	50
Elie	100	Max Kolb	100
Eminence	33	Miss Chrissie Paton	66
Florizel	91	Miss D. Brown	50
Fred Williams	100	Miss Finlay	50
G. C. Murray	41	Miss Michie	50
George Palmer	100	Molly Pope	100
Gertie	100	Moseley Perfection	66
Glow	100	Moseley Purple	33
Grievei	100	Mrs. Allsop	83
Hector McDonald	91	Mrs. C. B. Douglas	83
Holyrood	100	Mrs. C. F. Gordon	66
Ithuriel	100	Mrs. Chichester	83
Ivanhoe	83	Mrs. C. Turner	83
James Erskine	66	Mrs. Davidson	100
James Pilling	100	Mrs. Geo. Charles	33
James Sim	83	Mrs. Geo. Paterson	83
Janet Thomson	66	Mrs. Gloag	50
J. B. Riding	100	Mrs. H. Kinross	50
Jean Craik	100	Mrs. J. Girdwood	50
Jenny Houston	50	Mrs. J. Gray	0
John Currie	50	Mrs. J. Kinnear	50
John Ferrier	16	Mrs. Marrison	100
John Forbes	83	Mrs. McGraire	100
John Quarton	91	Mrs. Norris-Elye	66
Jubilee	100	Mrs. Pat	100
Kate Blyth	100	Mrs. R. Ellis	66
Kate Cochrane	58	Mrs. Scott Elliot	100
Kingcup	61	Mrs. T. W. R. Johnston	66
Kitty Bell	88	Mrs. W. Sydenham	50
Klondyke	83	Nellie	83
Lady Grant	66	Nellie Chapman	100
Lady Newlands	66	Nelly M. Brown	100
Lady of the Snows	83	Ophelia	100
Lark	66	Palmer's White	100
Lavender Queen	50	P. A. Smith	100
Lilacina	83	Pembroke	58
Lilian	0	Pencaitland	100
Lizzie Paul	100	Perdita	66
Lyric	83	Polly	50
Mabel	66	Primrose	100
Maggie Clunas	83	Princess May	100

Progress	33	The Mearns	66
Purity	66	Thomas Bell	33
Queen of the Year	100	True Blue	83
Redbraes White	83	Violetta	100
Redbraes Yellow	50	Virgin White	91
Robert Hastie	83	Walter Welsh	66
Robert M. Grier	50	Waverley	83
Robert Neil	66	White Beauty	100
Rolph	100	White Duchess	83
Rotherfield Belle	100	White Empress	33
Royal Blue	83	W. H. Woodgate	50
Royal Scot	100	William Daniels	100
Royal Sovereign	66	William Hamilton	0
Shamrock	100	William Hunter	83
Sir Robert Pullar	33	William Neil	75
Snowflake	83	William Robb	100
Snowline	100	Willie Farmer	100
Sylvia	100	Woodcock	33

The following varieties were especially commended for having stood well through two seasons:—

White.

Dawn
James Pilling
Kate Blyth
Palmer's White
Pencaitland
Snowflake
Virgin White

Yellow and Golden Shades.

Bullion
Grievei
Kingcup
Molly Pope
Primrose
Walter Welsh

Purple and Violet Shades.

Arabella
Archie Grant
cornuta
Countess of Kintore
Ivanhoe
Kitty Bell
Maggie Mott
Max Kolb
Rotherfield Belle
William Robb

Violet-blue and white.

Mrs. Chichester

STRAWBERRIES AT WISLEY, 1913.

SIXTY-SEVEN stocks of Strawberries were grown in the trial, this being the second year after planting. Treating Strawberries as annuals, or, in other words, fruiting the plants the first year, is not a success on the light hot soil at Wisley, but two-year-old plants succeed very well. The crop of 1913 was exceptionally heavy, nearly all the varieties cropping excellently.

F.C.C. = First Class Certificate.

A.M. = Award of Merit.

1. Aprikose (Lloyd).—Fruit large, round, dull red, with prominent seeds ; flesh reddish and of good flavour. Crop light ; foliage broad.

2. Bar 9 (Laxton).—Fruit large, conical, bright red, seeds prominent, flesh whitish, firm, of rich flavour. Heavy crop ; ripe June 26. Foliage large and broad.

3. Bedford Champion (Laxton), **A.M.** July 4, 1905.—Fruit of good size, conical or round, bright scarlet with depressed seeds and whitish flesh, deeply tinted with pink ; good flavour. Foliage medium. Very good crop ; ripe June 23.

4. British Queen (R.H.S.), **F.C.C.** July 15, 1913.—Fruit large, conical or wedge-shaped, red ; flesh firm, whitish, and of excellent flavour. Seeds partially buried ; foliage medium. Crop heavy ; ripe July 5.

5. Climax (Laxton).—**A.M.** for forcing April 27, 1909. Fruits medium, round or conical, deep red ; seeds slightly depressed ; flesh firm, whitish, and of good flavour. Foliage small. Crop heavy ; ripe July 5.

6. Connoisseur (Laxton), **F.C.C.** July 1, 1913.—This was considered to be the best-flavoured variety in the trial. Fruits large, bright scarlet, wedge-shaped ; seeds depressed ; flesh whitish. Crop good ; ripe June 26. Foliage large and broad, borne on tall petioles.

7. Continuity (Bunyard).—Fruit medium, round, dark red ; seeds prominent ; flesh firm, whitish, of poor flavour. Crop fair ; ripe June 26. Plants of compact habit ; foliage medium.

8. Cropper (Laxton), **A.M.** July 15, 1913.—Fruit large, conical, bright red ; seeds deeply buried ; flesh white and of excellent flavour. Crop very heavy ; ripe June 23. Leaves large and broad.

9. Dr. Hogg (Bunyard), **F.C.C.** July 3, 1866.—Fruit large, round, bright red ; seeds depressed ; flesh firm, whitish ; flavour excellent, sharp. Crop good ; ripe July 5. Foliage medium. This is one of the best of the later varieties.

10. Dreadnought (Carvill).—This is the result of a cross between ' Sir Joseph Paxton ' and ' Dr. Hogg.' Fruit medium, conical, dark

red ; seeds depressed ; flesh firm, reddish ; flavour excellent. Crop good ; ripe July 5. Foliage medium.

11. Eaton Grove Favourite (Daniels).—This stock, being received in October 1912, did not mature sufficient fruit for description.

12. Empress of India (Laxton), **F.C.C.** May 17, 1892.—Fruit medium, conical, red ; seeds depressed ; flesh white and of excellent flavour. Crop fair ; ripe July 5. Foliage medium. The Committee did not consider this a true stock.

13. Epicure (Laxton).—Fruit medium, bright scarlet, conical with blunt apex ; seeds buried ; flesh solid, whitish, and of good flavour. Crop good ; ripe June 26. Foliage large and broad.

14. Excelsior (Smiles), **A.M.** June 20, 1911.—Fruit of medium size, oval to wedge-shaped, bright red in colour, with red depressed seeds ; flesh pale pink, firm, very juicy, and of excellent flavour. Plant robust, with broad foliage. Crop fair ; ripe June 26.

15. Filbert Pine (Laxton).—Fruit rather small, conical or wedge-shaped, dull red ; seeds dark and deeply buried ; flesh white, solid, and of delicious flavour. Crop moderate ; plants strong and vigorous in habit ; foliage medium, borne on long petioles.

16. Fillbasket (Laxton), **A.M.** July 23, 1907.—Fruit medium, conical, bright red ; seeds depressed ; flesh firm, white, of good, rather sharp, flavour. Crop very heavy.

17. Givon's Late Prolific (Laxton), **F.C.C.** July 22, 1902.—This is the best of the late varieties, and is the result of a cross between 'Waterloo' and 'Latest of All.' Fruit large, wedge-shaped, dark crimson ; seeds depressed ; flesh reddish, firm, juicy, and of excellent flavour. Plants of compact habit, with small leaves borne on short petioles. Crop good.

18. Gunton Park (Laxton), **F.C.C.** July 21, 1891.—Fruit large, wedge-shaped, bright scarlet ; seeds buried ; flesh reddish, firm, and of good flavour. Crop good ; ripe June 26. Foliage large and broad.

19. Kentish Favourite (Pierce), **A.M.** June 25, 1907.—Fruit medium, round or conical, red ; seeds prominent ; flesh firm, whitish, of good flavour. Crop good ; ripe June 26. A compact grower, with small foliage. This variety is considered to be synonymous with 'Leader.'

20. King George V. (Hibberd).—Fruit medium, conical, sometimes wedge-shaped, bright red ; seeds yellow, depressed ; flesh reddish, firm, and of good flavour. Crop heavy ; ripens late. Foliage medium.

21. King George V. (Laxton).—This stock, being received in September 1912, did not mature sufficient fruit for description.

22. La France (Laxton).—Fruit rather small, conical, bright scarlet ; seeds dark, prominent. Flesh solid, whitish, of good flavour. Crop heavy ; ripe, June 26. Foliage medium ; plant a strong grower.

23. La Grosse Sucrée (Laxton).—Fruit medium, long conical, very dark red ; seeds buried. Flesh firm, white, and of good flavour. Crop poor ; ripe June 26. Plants not vigorous in growth ; foliage medium.

24. Latest (Laxton), **A.M.** June 12, 1904.—Fruit very large, heavy, wedge-shaped, deep crimson; seeds dark, depressed. Flesh deep red, very firm and of excellent flavour. Crop moderate; ripens very late in the season. Foliage medium; a very robust grower.

25. Latest of All (Laxton), **F.C.C.** July 24, 1894.—A very late variety, obtained as the result of a cross between 'British Queen' and 'Helena Gloede.' Fruit large, conical, or wedge-shaped, red; seeds prominent, dark. Flesh white, firm, and of good flavour. Crop heavy. A very compact grower.

26. Laxton's Count (Laxton).—A useful variety, raised as the result of a cross between 'Countess' and 'The Bedford.' Fruit medium, conical, bright crimson; seeds small, prominent. Flesh white, solid, and of good flavour. Crop moderate; ripe July 5. Foliage large.

27. Leader (Laxton), **F.C.C.** May 14, 1895.—Fruit large, broad wedge-shaped, bright red; seeds slightly depressed. Flesh firm, whitish, and of very good flavour. Crop good; ripe June 26. Foliage medium; habit dwarf and compact.

28. Lord Suffield (Laxton), **F.C.C.** July 21, 1891.—Fruit mostly small, some large, wedge-shaped, red; seeds prominent. Flesh reddish, solid, and of good flavour. Crop heavy; ripe June 26. Leaves large, dark green, and very broad. A vigorous grower.

29. Maincrop (Laxton).—A fine maincrop variety, raised from a cross between 'Bedford Champion' and 'The Laxton.' Fruit medium, conical, bright scarlet; seeds slightly depressed. Flesh whitish, firm, and of good flavour. Crop good; ripe July 7. Foliage medium.

30. Mentmore (Laxton), **A.M.** June 29, 1897.—The result of a cross between 'Noble' and 'British Queen.' Fruit medium, conical, bright crimson; seeds prominent. Flesh solid, reddish, of good flavour. Crop fair; ripe June 26. Foliage medium; habit dwarf and compact.

31. Merveille de France (Bunyard, Fisher), **A.M.** September 10, 1912.—An autumn-fruiting variety. Fruit small, roundish, red; seeds depressed. Flesh white, solid, of good flavour. Crop heavy; ripe July 5. Foliage large, broad; habit compact.

32. Monarch (Bunyard), **F.C.C.** June 25, 1895.—Fruit medium, wedge-shaped, bright red; seeds prominent. Flesh firm, white, of very good flavour. Crop heavy; ripe June 26. Foliage large and broad.

33. Monsieur Fournier (Warburton).—Fruit medium, round, dark red; seeds deeply buried. Flesh whitish, firm, and of excellent flavour. Crop good; ripe June 23. Leaves broad.

34. Noble (Laxton), **F.C.C.** July 1, 1886.—Fruit conical, medium, red; seeds prominent. Flesh reddish, firm; flavour poor. Crop good; ripe June 26. Foliage broad.

35. Perpetual (Laxton), **A.M.** September 14, 1907.—Fruit medium, many small, conical or round, dark red; seeds prominent. Flesh red, firm, of good, sweet flavour. Crop heavy; ripe June 26. Habit dwarf

and compact; leaves small. A continuous cropper from June till autumn. The result of a cross between 'Monarch' and 'St. Joseph.'

36. Peters' Olympia (Peters), **A.M.** July 4, 1911.—This stock, being received in September 1912, did not mature sufficient fruit for description.

37. Pineapple (Laxton).—Fruit medium, conical, dark red; seeds depressed. Flesh whitish, firm, solid, and of good flavour. Crop good; ripe June 26. Foliage large and broad; habit vigorous.

38. President (Bunyard).—Fruit medium, roundish, bright red; seeds depressed. Flesh white, solid, and of rich flavour. Crop fair. Foliage medium.

39. Profit (Laxton).—Fruit very large, broad wedge-shaped, red; seeds not deeply buried. Flesh reddish, firm, and of very good flavour. Foliage medium. Crop good; ripe June 26.

40. Progress (Laxton), **A.M.** July 15, 1913.—A fine late variety. Fruit large, conical, bright red; seeds depressed. Flesh white, solid, of rich flavour. Crop heavy. Foliage very large, broad, dark green, borne on long petioles.

41. Reine d'Août (Bunyard).—Fruit small, conical or round, dull red; seeds dark, prominent. Flesh whitish, solid, of excellent flavour. Crop light; ripe June 23. Habit compact; foliage medium, supported on short petioles.

42. Reliance (Laxton).—Fruit large, wedge-shaped, bright scarlet; seeds prominent. Flesh whitish, solid, and of good flavour. Crop good; ripe June 26. Leaves large, broad; habit vigorous.

43. Reward (Laxton), **A.M.** July 5, 1898.—The award to this Strawberry was confirmed on June 28, 1904. A fine maincrop variety, raised as the result of a cross between 'Royal Sovereign' and 'British Queen.' Fruit medium, rich scarlet, conical; seeds prominent; flesh red, firm, of excellent flavour. Crop fair; ripe June 26. Foliage small; habit compact.

44. Rival (Laxton), **A.M.** July 15, 1913.—Fruit small, bright red, conical; seeds depressed; flesh reddish, solid, of very good flavour. Crop heavy. Foliage medium.

45. Royal Sovereign (Bunyard), **F.C.C.** June 21, 1892.—This is considered to be the best early Strawberry, and for forcing it is excellent. Fruit large, conical, bright scarlet; seeds buried; flesh reddish, solid of, good flavour. Crop moderate; ripe June 26. Leaves large and broad.

46. Scarlet Queen (Laxton).—A fine early variety, resulting from a cross between 'Noble' and 'King of the Earlies.' Fruit small, round, dark red; seeds depressed; flesh reddish, solid, and of excellent flavour. Crop heavy; ripe June 26. Foliage medium; habit compact.

47. Seedling (Kent and Brydon).—Fruit small, conical, bright red; seeds deeply buried; flesh white, solid; flavour poor. Crop heavy. Leaves small, borne on short petioles.

48. Sensation (Laxton).—Fruit medium, round, scarlet; seeds

dark, deeply buried; flesh whitish, flavour poor. Crop heavy; ripe June 26. Foliage broad, abundant.

49. St. Antoine de Padoue (Laxton), **A.M.** August 28, 1900.—A good perpetual-fruiting variety, raised from 'St. Joseph' and 'Royal Sovereign.' Fruit medium, nearly round, bright scarlet; seeds prominent; flesh firm, white, and of pleasant flavour. Crop moderate; ripe June 26. Leaves medium; habit compact.

50. St. Joseph (Laxton), **A.M.** September 20, 1898.—A well-known perpetual-fruiting variety, raised by M. l'Abbé Thivolet, of Chenoves, who crossed the true Alpine Strawberry with a garden variety. Fruit small, roundish, dark red; seeds slightly depressed; flesh white, solid, very juicy, and of good, sweet flavour. Crop poor. Foliage small.

51. The Bedford (Laxton).—This variety, resulting from a cross between 'Dr. Hogg' and 'Sir Charles Napier,' proved to be a weak grower in the Wisley soil. Fruit medium, bluntly conical, bright scarlet; seeds prominent; flesh white, solid, of delicious flavour. Crop poor. Foliage small.

52. The Captain (Laxton).—Fruit small, conical, bright red; seeds dark, buried; flesh white, tinged with red, firm, of good flavour. Crop heavy, late. Foliage medium. This variety was raised from 'Crown Prince' crossed with 'Forman's Excelsior.'

53. The Earl (Laxton).—This variety is the result of a cross between 'Waterloo' and 'Royal Sovereign.' Fruit medium, round, dark red; seeds depressed; flesh whitish, and of excellent flavour. Crop small; ripe July 5. Leaves large and broad.

54. The Laxton (Laxton), **F.C.C.** June 18, 1901.—This variety is the result of a cross between 'Royal Sovereign' and 'Sir Joseph Paxton.' Fruit very large, deep red, conical; seeds slightly depressed; flesh reddish, very juicy, and of good flavour. Crop good; ripe June 26. Foliage medium; habit vigorous.

55. The Queen (Laxton).—This variety did not mature a sufficient crop for description.

56. Trafalgar (Laxton), **A.M.** June 5, 1900.—Fruit large, wedge-shaped, red; seeds reddish, prominent; flesh white and of good flavour. Crop heavy; ripe June 26. Foliage medium.

57. Tuckswood Early (Laxton).—Fruit medium, dark red, conical; seeds depressed; flesh reddish, solid, of fairly good flavour. Crop very heavy; ripe June 26. Foliage medium.

58. Twentieth Century (Vizard).—Fruit large, conical, bright red; seeds buried; flesh reddish, solid, flavour poor. Crop very heavy; ripe July 5. Foliage medium; growth compact.

59. Unique (Laxton).—Fruit medium, bright red, roundish; seeds dark, prominent; flesh white, firm, and of rich, sweet flavour. Crop small; ripe July 5. Foliage broad.

60. Utility (Laxton).—A good late variety. Fruit medium, wedge-shaped, bright crimson; seeds slightly depressed; flesh reddish solid, of good flavour. Foliage medium, borne on short petioles.

61. Veitch's Perfection (J. Veitch), **F.C.C.** July 14, 1896.—The result of a cross between 'British Queen' and 'Waterloo.' Fruit medium, conical, dark red; seeds prominent; flesh white and of good flavour. Crop heavy. Foliage medium and resembling that of 'British Queen.'

62. Veritas (Staward).—This variety, being received in March 1913, did not mature a sufficient crop for description.

63. Vicomtesse Héricart de Thury (Laxton).—Fruit small, a few large, conical, bright red; seeds yellow, slightly imbedded; flesh pale red throughout, firm and solid, richly flavoured. Crop heavy; ripe June 23. Foliage small.

64. V. M. 2 (Laxton).—Fruit medium, round, dark red; seeds prominent; flesh whitish, solid; flavour good. Crop excellent, ripe June 26. Foliage medium.

65. V. Y. 8 (Laxton).—Fruit of good size, roundish, dull red; seeds depressed; flesh whitish, solid, juicy, of excellent, sweet flavour. Crop very heavy; ripe June 26. Foliage large and broad.

66. V. 17 (Laxton).—Fruit medium, conical, dark red; seeds deeply buried; flesh white, solid, of good flavour. Crop good; ripe June 26. Foliage medium; habit compact.

67. Yarles (Lloyd).—Fruit medium, conical, bright red; seeds slightly depressed; flesh reddish, firm and of good flavour. Crop good; ripe June 26. Foliage large and broad.

TOMATOS AT WISLEY, 1913.

NINETY-FOUR stocks of Tomatos, in eighty-eight varieties, were sent in for trial. With a few exceptions sent in late, all were sown on March 11, and grown under exactly similar conditions both inside and outside. For the first time in many years, there was an attack of Black Spot, which we attribute to too much manure, but it was instructive and very interesting to note the varieties that were attacked and those that were immune. Those with fruit free from Black Spot were numbers 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 59, 60, 62, 64, 66, 67, 68, 69, 71, 73, 74, 76, 77, 79, 81, 82, 83, 84, 85, 86, 88, 89, 91, 92, 93. Those with fruit attacked were 1, 5, 58, 61, 63, 65, 70, 72, 75, 80, 87, 90. There was no sign of Black Spot or any other disease on the outdoor plants. The Committee examined both the indoor and outdoor plants.

F.C.C. = First-class Certificate.

A.M. = Award of Merit.

XXX = Highly Commended.

*1. **Al** (Sutton).—Fruit medium, round, smooth, bright red; free setter; foliage and habit robust. Crop abundant, borne in good trusses, ripe August 6. Outside crop poor and very late in ripening.

2. **Abundance** (Sutton).—Fruit small, flat, round, bright red, smooth; fairly good setter; habit and foliage good; crop poor, ripe July 21. Outside crop fair, ripe August 25.

3. **Ailsa Craig** (Balch), **A.M.** August 30, 1910.—Fruit of moderate size, round, red, smooth; free setter; trusses carrying an average of seven fruits; crop good, ripe July 21. Foliage large, habit vigorous. Outside crop heavy, ripe August 18.

4. **Aviator** (Dickson and Robinson).—Fruit medium, flat round, dull red, very smooth; very free setter; trusses heavily laden; crop excellent, ripe July 28. Habit sturdy and vigorous. Outside crop very good, ripe August 18.

5. **Ayrshire** (Balch), **A.M.** August 30, 1910.—Fruit large, roundish, bright red, smooth; free setter; a very strong grower; crop fair, ripe July 28. Outside crop fairly good, ripe August 25.

6. **Best of All** (Sutton).—Fruit large, flat round, bright red, smooth; free setter; not a vigorous grower; crop medium, ripe August 9. Outside crop fair, ripe August 18.

7. **Blenheim Orange** (Carter), **A.M.** September 20, 1892.—Fruit of medium size, flat round, pale orange tinged with deeper shades,

* See footnote, vol. xxxviii. p. 549.

smooth ; a free setter ; trusses carrying an average of seven fruits ; growth strong ; crop good, ripe July 28. Outside crop fair, ripe August 25.

8. Bonny Best (Burpee).—Fruit large, round or slightly flattened, dark red, very smooth ; a free setter ; trusses carrying an average of seven fruits ; crop good, ripe July 21. Habit vigorous, foliage large and healthy. Outside crop good, ripe August 18.

9. Improved Carrick (Balch), **A.M.** August 30, 1910.—Fruit medium, flat round, red, smooth ; trusses carrying an average of eight fruits ; a very free setter ; crop excellent, ripe July 28. Growth very vigorous. Outside crop good, ripe August 18.

10. Cascade (Sutton).—Fruit small, round, bright red, borne abundantly on pendulous racemes measuring about 2 feet in length. Crop ripe July 21. Growth strong ; foliage medium and healthy. Outside crop fair, ripe August 25.

11. Champion (Dobbie).—Fruit medium, flat round, bright red, smooth ; a free setter and a strong grower ; crop good, ripe July 28. Outside crop fair, ripe August 25.

13, 14. Comet (J. Veitch, Wood), **A.M.** July 25, 1899.—Fruit large, flat round, bright red, smooth ; a free setter ; crop heavy, borne in good trusses ; ripe July 28. Growth vigorous. Outside crop fair, ripe August 18.

12. Conference (Dobbie), **F.C.C.** August 13, 1889.—Fruit large, flat round, bright red, smooth ; trusses carrying an average of eight fruits ; a good setter ; habit vigorous. Crop heavy, ripe August 1. Outside crop fairly good, ripe August 25.

15. Dessert (Sutton).—Fruit small, round, dark red, smooth ; a free setter ; trusses carrying an average of eleven fruits. Crop heavy, ripe July 21. Habit strong, foliage large. Outside crop good, ripe August 11.

16. Duke of York (Carter), **F.C.C.** July 23, 1895.—Fruit medium, flat round, deep red, slightly corrugated, borne in good trusses ; a free setter and a good grower. Crop medium, ripe August 1. Outside crop fair, ripe August 25.

17. Dumbleton Favourite (Wheeler).—Fruit, rather small, flat round, bright red ; a free setter ; crop good, ripe August 1. Plants vigorous. Stock requires a little more selection. Outside crop fair, ripe August 25.

18. Dwarf Gem (Sutton).—Fruit large, deep golden yellow, flat round, smooth, borne in good trusses. The plant is of moderate growth and has dark green, much wrinkled foliage. Crop good, ripe August 1. Outside crop poor, ripe August 25.

19. Dwarf Giant (Burpee).—Fruits medium, flat round, dull red, somewhat corrugated, borne in good trusses ; crop good, ripe August 6. Plants of dwarf habit. Outside crop very poor, ripens late.

20. Earliana (Burpee).—Fruits large, round or flat round rather irregular, corrugated, red, borne in well-laden trusses ; a free setter. Crop good, ripe July 28. Outside crop good, ripe August 11.

21. Earliest (Dobbie).—Fruit medium, bright red, flat round, smooth; a free setter; trusses heavily laden; plants very vigorous. Crop excellent, ripe August 1. Outside crop heavy, ripe August 18.

22. Early Danish (Carter).—Fruit medium, bright red, flat round, smooth; a free setter; trusses carrying an average of six fruits. Plants of good constitution; crop excellent, ripe August 6. Outside crop very good, ripe August 18.

23. Early Dawn (J. Veitch).—Fruit medium, bright red, flat round, smooth; a good setter borne in good trusses; plants vigorous. Crop very good, ripe August 6. Outside crop good, ripe August 18.

24. Early Jewel (Burpee).—Fruit large, very handsome, bright red, flat round, smooth; trusses carrying an average of five fruits. Crop heavy, ripe August 1. A strong grower and a free setter. Outside crop fairly good, ripe August 25.

25, 26.—Early Market (Sutton, Barr).—Fruit medium, flat round, bright red, very smooth, borne in trusses averaging eight fruits. A very free setter and a prolific bearer, ripe August 6. Plants of excellent constitution. Outside crop excellent, ripe August 25.

27. Earliest of All (Sutton).—Fruit large, flat round, light red, smooth; a very free setter; trusses branched. Crop excellent, ripe July 21. Foliage medium; habit robust. Outside crop heavy, ripe August 11.

28. Early Ruby (Barr).—Fruit medium, flat round, bright red, slightly corrugated, borne in good trusses; sets very freely; a strong grower. Crop excellent, ripe July 28. Outside crop good, ripe August 25.

29. Earliest Pink (Burpee).—Fruit medium, flat round, dull red, very smooth, borne in good trusses carrying an average of seven fruits; a free setter. Crop heavy, ripe July 28. Growth vigorous. Outside crop fair, ripe August 11.

30. Eclipse (Sutton).—Fruit large, flat round, bright red, slightly corrugated, borne in good trusses; a free setter; crop heavy, ripe August 1. Plants vigorous. Outside crop fairly good, ripe August 25.

31. Fillbasket (Balch), **A.M.** August 15, 1905.—Fruit large, flat round, smooth, borne in trusses averaging eight fruits each. A free setter; plants strong in growth; crop excellent, ripe August 1. Outside crop very good, ripe August 18.

32. Fordhook Fancy (Burpee).—Fruit small, dull red, flat round, smooth; crop fair, ripe August 6. Plants dwarf; leaves dark green, much wrinkled and very persistent. Outside crop poor, ripe August 25.

33. Frogmore Selected (J. Veitch), **F.C.C.** April 24, 1894.—Fruit medium, light red, smooth, round, borne in good trusses. Crop good, ripe August 6. Plants of very vigorous constitution. Outside crop poor and very late in ripening.

34. Garland (Dobbie), **XXX** August 26, 1913.—A small round variety somewhat like 'Cascade,' borne in pendulous racemes measuring 3 feet in length. The fruits are bright red and are produced

in great abundance. The plant is of vigorous habit and a very free setter. Crop ripe July 28. Outside crop very fair, ripe August 18.

35. Glory (R. Veitch).—Fruit of good size, bright red, flat round, smooth, borne in nice trusses. Crop good, ripe August 6. Plants vigorous in growth. Outside crop fair, ripe August 25.

36. Golden Jubilee (J. Veitch), **F.C.C.** May 26, 1897.—Fruit medium, clear golden colour tinged with orange, perfectly smooth, roundish, borne in trusses averaging five fruits each. Plants sturdy ; crop good, ripe August 6. Outside crop fair, but late in ripening.

37. Golden Nugget (Sutton), **F.C.C.** Aug. 14, 1894.—Fruit small, round, very smooth, deep orange-yellow, borne in trusses averaging ten fruits. A very free setter and a prolific bearer, ripe August 1. Plants vigorous in growth. Outside crop fairly good, ripe August 25.

38. Golden Perfection (Sutton).—Fruit large, golden yellow, flat round, smooth, of good shape, borne in good trusses. Crop good, ripe August 6. Plants vigorous in growth. Outside crop poor, ripens very late.

39. Golden Sunrise (Carter), **XXX** August 26, 1913.—Fruits medium, flat round, smooth, golden yellow, borne in trusses averaging eight fruits each. A very free setter ; crop heavy, ripe August 1. Outside crop fair, ripe August 11.

40. Greengage (Carter).—Fruit small, but larger than those of No. 37, globular, deep orange-yellow, very smooth, borne in good trusses averaging eight fruits each. Crop very heavy, ripe August 6. Outside crop fair, ripe August 11.

41. Harbinger (Barr).—Fruit medium, flat round, bright red, somewhat corrugated ; a free setter. Crop moderate, ripe August 1. Outside crop fair, ripe August 11.

42. Holmes' Ideal (Sydenham), **XXX** August 26, 1913.—Fruit large, roundish, very smooth, bright red, borne in excellent trusses averaging nine fruits each. Plants of good constitution ; crop heavy, ripe August 6. Outside crop heavy, ripe August 25.

43. Holyrood (Dobbie), **XXX** August 26, 1913.—Fruit medium, roundish, very smooth, bright red, borne in trusses averaging nine fruits each. Plants vigorous. Crop heavy, ripe August 6. Outside crop fairly good, but very late in ripening.

44. Hurst Marvel (Drover), **XXX** August 26, 1913.—Fruit medium, flat round, bright red, smooth, borne in large trusses. A very free setter and a vigorous grower. Crop heavy, ripe August 9. Outside crop good, ripe September 2. An excellent variety.

45. Invicta (J. Veitch).—A very fine Tomato. Fruit, very large, smooth, round, bright red ; crop heavy, ripe August 6. The trusses are heavily laden with fruit. Outside crop very good, ripe August 25.

46. Improved Jolly Boy (Balch).—Fruit large, smooth, bright red, roundish, borne in good trusses, ripe about August 6. Crop good. Plants of vigorous constitution. Outside crop good, but late in ripening.

47. Liberty (Dickson), **XXX** August 26, 1913.—Fruit medium, round, bright red, very smooth, borne in good trusses averaging nine fruits each. Crop heavy, ripe August 6. Plants strong. Outside crop fair, but late in ripening.

48. Lightning (Barr), **XXX** August 26, 1913.—Fruit medium, bright red, smooth, roundish, borne in good trusses averaging nine fruits. Plants exceptionally vigorous; a free setter; crop heavy, ripe August 6. Outside crop heavy, ripe August 25.

49. Little Gem (Barr), **F.C.C.** August 20, 1877.—A curious variety, of moderate height, with small, very much wrinkled, dark green foliage; fruit very small, bright red, flat round, very smooth, borne in crowded racemes; a free setter. Crop heavy, ripe August 6. Outside crop poor, ripe September 2.

50. Little Marvel (Dickson).—Fruit large, very smooth, bright red, flat round, borne in good trusses; a free setter and a vigorous grower. Crop good, ripe August 6. Outside crop good, ripe August 25.

51. Locksheath Marvel (Locksheath).—Fruit large, flat round, bright red, very smooth, borne in good trusses. Crop good, ripe August 1. Growth vigorous. Outside crop heavy, ripe August 18.

52. Longkeeper (Barr).—Fruit very large, flat round, dull cherry red, smooth, borne in good trusses; a free setter and a prolific bearer, ripe August 1. Growth very vigorous and healthy. Outside crop fair, ripe August 25.

53. Long Purple (Barr).—Fruit small, round conical, dark red, smooth, borne in large trusses averaging eight or nine fruits each. A free setter, bearing a heavy crop, ripe August 6. Plants of good constitution. Outside crop poor and ripening late.

54. Lucullus (Heinemann).—Fruit medium, flat round, very smooth, bright red, borne in trusses averaging seven fruits. Crop heavy, ripe August 5. Plants of good constitution; a free setter. Outside crop heavy, ripe August 25.

55. Magnificent (Barr).—Fruit medium, bright fiery red, flat round, slightly corrugated, borne in large trusses. Crop heavy, ripe August 5. A free setter and a strong grower. Outside crop poor, ripe August 25.

56. Magnum Bonum (Sutton).—Fruit medium, flat round, bright red, slightly corrugated, borne in large trusses on strong, vigorous plants. Crop good, ripe August 5. Outside crop good, ripe August 25.

57. Maincrop (Sutton).—Fruit large, flat round, bright red, smooth; a free setter and a vigorous grower. Crop good, ripe July 28. Outside crop good, ripe August 18.

58. Mark's Tey (Dobbie).—Fruit rather small, flat round, bright red, very smooth; a free setter and a vigorous grower; crop good, ripe August 6. Outside crop good, ripe August 25.

59. Marvel (Turner).—Fruit medium round, fiery red, smooth. A free setter; crop good, ripe August 5. Plants strong in growth. Outside crop good, ripe August 25.

60. Matchless (Wheeler).—Fruits rather small, but of useful size, flat round, bright red, smooth, borne in great abundance in good trusses. Ripe August 5. Outside crop good, ripe August 25. A vigorous grower.

61. Moneymaker (Dickson and Robinson).—Fruit large, round, fiery red, smooth. Trusses large, crop good, ripe August 5. Growth vigorous. Outside crop fair, ripe August 25.

62. New Dwarf Red (J. Veitch), **A.M.** August 15, 1905.—Fruit medium, dark red, roundish, very smooth; a free setter; crop moderate, ripe August 6. Plants strong. Outside crop fairly good, but late in ripening. Height about 4 feet.

63. Northern King (Barr).—Fruit medium, flat round, smooth, bright red, borne in fair trusses; crop fair, ripe August 30, the latest indoor tomato in the trial. Plants very strong in growth. Outside crop poor and late in ripening.

64, 65, 66. Open Air (Dickson, Sutton, Sydenham).—Fruit large, sets freely, bright red, flatter than most varieties, borne in large trusses. The plant is a vigorous grower and produced heavy crops, ripening August 1 under glass and about 20 days later in the open, where the fruit attained a very large size.

67. Peachblow (Sutton).—A very distinct variety, having large round and very smooth fruits of a delicate carthamus red colour. They are borne in trusses averaging eight fruits. Plants very strong in growth, carrying a heavy crop, commencing to ripen August 2. Outside crop good, ripe August 28.

68. Pear-Shaped (Barr), **XXX** August 26, 1913.—A small pear-shaped fruit, very smooth, bright red, borne with great freedom in pendulous racemes averaging ten fruits. The plant is sturdy in growth. Crop heavy, ripe July 28. Outside crop fair, ripe August 25.

69. Perfection (Sutton).—Fruit large, very bright red, flat round, slightly corrugated, borne in good trusses. Crop fair, ripe August 5. Plants vigorous in growth. Outside crop poor, ripe September 2.

70. Pride of the Market (Barr).—Fruit medium, flat round, slightly corrugated, bright red. Crop fair, ripe August 6. Plants vigorous. Outside crop fair, ripe August 25.

71. Primus (Roscoe).—Fruit medium, round, red, smooth, sets freely. The trusses carry an average of seven fruits. Foliage medium, habit vigorous. Crop good, ripe July 21. Outdoor crop heavy, ripe August 11.

72. Princess of Wales (Sutton), **A.M.** August 15, 1905.—Fruit medium, flat round, dark red, smooth, sets freely. Crop fair, ripe August 9. Plants sturdy. Outdoor crop fair, ripe August 18.

73. Prolific (Wheeler).—Fruit medium, round, bright red, smooth, borne in large trusses. Plants of vigorous constitution and having large leaves in which the usual serration is almost absent. Crop excellent, ripe August 5. Outdoor crop very good, ripe August 11.

74. Quarter Century (Burpee).—Fruit medium, flat round, bright scarlet; the plants are of short-jointed, sturdy growth, with dark

green, much wrinkled foliage. Crop fair, ripe August 5. Outdoor crop poor, ripe September 2.

75. Red Riding Hood (Barr).—Fruit large, flat round, bright red, smooth. The trusses are straggling and carry an average of seven fruits. Habit vigorous; foliage large. Crop good, ripe July 21. Outside crop fair, ripe August 18.

76. Satisfaction (Sutton), **A.M.** August 15, 1905.—Fruit large, roundish, bright red, smooth, sets freely. Growth strong. Crop good, ripe July 28. Outdoor crop fair, ripe August 18.

77. Solidarity (Martin).—Fruit large, bright red, smooth, borne in good trusses. Plants healthy and vigorous. Crop very good, ripe August 5. Owing to the weak germination of this variety, it was impossible to obtain sufficient plants for a trial in the open.

78, 79. Stirling Castle (R. and J. Veitch), **A.M.** September 6, 1898.—Fruit medium, very smooth, flat round, bright red; plants strong and vigorous. A free setter, bearing good trusses. Crop good, ripe August 7. Outdoor crop very good, ripe August 25.

80. Sunbeam (Sutton).—An exceptionally vigorous grower, bearing roundish smooth fruits of medium size and of a pale orange-yellow colour. Crop poor, ripe August 5. Outdoor crop fair, ripe August 25.

81, 82. Sunrise (R. Veitch, Carter), **F.C.C.** July 4, 1905.—The medium-sized fruits of this well-known variety are borne in great abundance on good trusses. They are roundish, smooth, bright red, and set very freely. Plants of strong constitution; crop excellent, ripe August 2. Outdoor crop good, ripe August 25.

83. Sunrise Improved (Carter).—Similar to Nos. 81 and 82, but have somewhat longer trusses.

84. Surprise (Grainger).—Fruit medium, fiery red, flat round, smooth. Crop moderate, ripe August 5. Plants of vigorous constitution. Outdoor crop fairly good, ripe August 25.

85. The Hastings (J. Veitch).—Fruit small, flat round, very bright red, smooth; trusses well laden, a free setter and a vigorous grower. Crop heavy, ripe July 28. Outdoor crop fair, but late in ripening.

86. Thick-fleshed (Barr).—A very vigorous grower, bearing large smooth fruits, flat round in shape and bright red in colour; trusses well laden. Crop good, sets freely, ripe August 9. Outdoor crop fair, ripens late.

87. Victory (J. Veitch).—Fruit medium, flat round, bright red, smooth, sets freely. Crop good, ripening indoors August 9 and in the open September 2.

88. Water Baby (Balch).—Fruit large, flat round, lobed, bright red, smooth, sets very freely. The trusses are heavily laden. Growth vigorous and strong, leaves large. Crop very good, ripe July 21. Outdoor crop good, ripe August 18.

89.—Winter Beauty (Sutton), **A.M.** April 18, 1899.—Fruit large, flat round, bright red, smooth, sets well. Crop good, ripe July 28. Outdoor crop fair, ripe August 25. A strong and vigorous grower.

90. Earliana (Staward).—This and the four following varieties were sent in late. Fruit similar to that of No. 20. Crop good, ripe July 21. Outdoor crop fair, ripe August 25.

91. Export of Libia (Dammann).—Fruit large, flat round, bright red, somewhat corrugated, borne in medium trusses. A free setter. Crop fair, ripe August 9. Requires a little more selection.

92. Fire of Vesuvius (Dammann).—Fruit small, bright scarlet, smooth, pear-shaped, borne in well-furnished trusses. Plants of vigorous growth. Crop heavy, ripe August 2. Foliage entire.

93. King Humbert (Dammann).—Fruit small, ovál, dull red, borne in good trusses, averaging eight to nine fruits. Plants vigorous in growth. Crop heavy, ripe August 9.

94. Newnham Paddox Prolific (Harmon).—Plants of this variety were sent in and were all planted in the open ground. Fruit medium, roundish, smooth, red, borne in trusses averaging eight fruits. Crop excellent, ripe September 1. Plants healthy and vigorous.

COMMONPLACE NOTES.

By the SECRETARY, SUPERINTENDENT, and EDITOR.

NATIONAL DIPLOMA IN HORTICULTURE.

THE particular attention of the Fellows is invited to the scheme for the establishment of a National Diploma in Horticulture which has been for some time occupying the attention of the Council. This scheme has been submitted to and approved by the Board of Agriculture, and will meet the demand that exists among professional horticulturists for some tangible mark of their professional ability, such as is open to the members of many other professions. The Society's General Examination imposed no test of practical skill and was open to all, but the Diploma Examinations are intended for professional gardeners, and will be confined to them on the lines laid down in the scheme, while the principal feature of the examinations will be the practical tests they include. Full particulars may now be obtained of the Secretary.

SAXIFRAGA BURSERIANA MAJOR.

Saxifraga Burseriana is one of the most beautiful of the "cushion" Saxifrages, not always easy to establish, but well repaying any trouble it may cost. It has produced several varieties, one of which, 'Gloria,' gained an Award of Merit in 1907, while the type had a First-class Certificate as long ago as 1884. Fig. 139 represents the form known as *major*. It is from a photograph kindly sent us by Colonel Hervey, in whose garden at Thurston, Bury St. Edmund's, it was growing. It is there planted in the rock garden with a south-east exposure. Like its parent type it flowers very early, in March, producing its huge white flowers—huge for the size of the plant—about 2 inches above the rosette of leaves.

PLANT PROPAGATION.

We have little doubt the following letter we recently received and Prof. Balfour's reply will be of interest to many of our Fellows. The method of propagation mentioned is one we have found remarkably productive of results, and the details referred to will clear up any little misunderstanding there might possibly be concerning it. A Fellow writes: "Can you help an interested but very ignorant member of the R.H.S. more fully to understand the article in the last issue (of the R.H.S. JOURNAL, March 1913) on the propagation of plants? My attention was drawn to the article in the first place

by an amateur gardening friend, who herself has the privilege of Canon Ellacombe's acquaintance; she had seen, and described to me roughly, his method of striking cuttings, which is referred to in Prof. Balfour's article as the 'French' method. Almost all cuttings can be rooted in a fortnight by this method, I gather; but can you tell me, must the 'full sunshine,' in which the propagating frame has to be placed, endure for a fortnight? If so, when could one ever dare to begin? Am I right in deducing from the article that by this method one may increase one's stock of plants at almost any time of the year? For amateur gardeners with no 'glass' and small purses, and who too are often absent from home at critical seasons of the year, this prospect is a delightful one. . . . May I add yet another question? When the 'full sunshine' fails should the watering every half-hour be continued?"

Professor Balfour replies: "The expression 'full sunshine' indicates an exposure in the double sense of (1) the position of the frames so as to secure the maximum of direct sunlight, and (2) the absence of all shade. There is, unfortunately, never a period of continuous full sunshine for a fortnight in this country.

"Cuttings can be struck by the method at any time of the year if the plant is suitable and the right part of the plant is taken. The striking will be slower or more rapid according to the circumstances.

"If the day is cloudy throughout, one watering will be ample. If the glimpses of sunshine are transient, two or three waterings will be sufficient.

"It may be helpful to add: (1) the medium for striking should be sand; (2) the cutting must be put in no deeper than is enough to keep it erect, and (3) there must be no preparatory dibbling; the cutting must be pushed into the sand and watered at once. The water must settle the sand round the cutting.

"The water used should be as near the temperature of the sand as possible, at least it should not be so cold as to chill. A thermometer should therefore be placed in the sand."

RENOVATION OF AN OLD TREE.

It not infrequently happens that one desires to save a tree that seems doomed to death but which has interesting associations with the past that no new and vigorous seedling can possibly have. The method illustrated in fig. 140 is one that may be used in some cases. The tree is a medlar, known as the 'George Herbert Medlar.' It was planted by George Herbert in 1632 in the Rectory garden at Bemerton, near Salisbury, and had almost reached the end of its long life when it occurred to Mr. Thos. Sharp, County Instructor in Horticulture in Wilts, to inarch it. A whitethorn was planted in 1907 and a branch (fortunately near the ground) was inarched upon it in the spring of 1908. The union was successful, and new vigour has been imparted to the tree. In 1913 an attempt was made to



FIG. 139.—SAXIFRAGA BURSERIANA MAJOR

[To face p. 416.



FIG. 140.—THE 'GEORGE HERBERT' MEDLAR. PLANTED 1632; INARCHED 1908.



FIG. 141.—*WISTARIA MULTIJUGA* AT WINTERFOLD, CRANLEIGH, SURREY.

assist the other part of the tree by grafting in a bridge of whitethorn some three and a half feet long between the renovated part and another old branch, with what result remains to be seen.

WISTARIA MULTIJUGA.

The beautiful *Wistaria multijuga* is far less known than its congener *W. chinensis*, yet its lilac and purple flowers in racemes not rarely thirty inches in length make it a most beautiful summer-flowering climber. It does not appear more exacting in its requirements than *W. chinensis*, and perhaps it is only because the latter was introduced from China in 1812, while *W. multijuga* did not reach our shores from Japan until 1874, that it is so little known. It is a favourite in Japanese gardens, and is perhaps at its best when associated with water in the garden as it is on the bridge at Wisley, but that it can be most decorative on a house is well shown by fig. 141, which by the kindness of Lord Alverstone we are able to reproduce. It was planted at Winterfold about twenty years ago and did not bloom for some time afterwards, as is not unknown with *W. chinensis*.

EXAMINATION OF SCHOOL TEACHERS IN COTTAGE AND ALLOTMENT GARDENING.

APRIL 23, 1913.

THERE was a reduction of 93 in the number of candidates for this examination, held on April 23, 1913, compared with last year, the number being 996 as against 1,089 in 1912. Of them 142 obtained a position in the first class, 426 in the second, and 320 in the third, leaving 83 failures, and 25 absentees.

The Examiners, Mr. F. J. Chittenden, F.L.S., Mr. John Fraser, F.L.S., Mr. John Odell, and Mr. C. R. Fielder, V.M.H., report as follows:—

Some of the questions in Section A were answered remarkably well, showing a very fair knowledge of practical gardening and the factors and conditions necessary for successful cultivation. This remark applies particularly to Question 4 (on seed) which was mostly well answered. Some candidates, however, failed to differentiate between true seed and "seed" potatoes. There is still an inclination to be over lavish in the use of farmyard manure; and in the case of artificial manures, the proportions of Phosphate, Potash, and Nitrate were given for certain crops, but frequently without any indication as to the *quantity* to be applied per yard or rod—a most important detail.

Some of the candidates did not know the difference between hardy and half-hardy Annuals, and between shrubs and herbaceous plants, the rose being frequently classed as an herbaceous plant, and the Christmas Rose as a shrub.

The Examiners are disappointed with the character of the answers in Section B. Care was taken to frame the questions so that they could not be answered adequately by Candidates who had merely "read up" for the examination without making themselves acquainted with the facts by observation of common garden plants. The main faults in the replies arose from lack of such acquaintance and a failure to read the questions asked as they were written; whilst the introduction of irrelevant matters into answers furnished evidence of a deficient knowledge of the subject of the question. Only the eleventh question in Section B was at all satisfactorily answered by perhaps half of the candidates.

Candidates would economize time and paper if they were more concise and systematic in their answers. In many instances matter relating to different parts of a question was so mixed up as to make it extremely difficult for the Examiners to give full value for the work done.

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 Hawkins, L. C., 59 King's Road, Kingston-on-Thames.
 Horn, H., Tysoe, Warwick.
 Houghton, F. J., 120 Mill Lane, Sutton, St. Helens.
 Hudson, A., Hillcroft, Baghill Lane, Pontefract.
 Nixon, H., Rydal Mount, Alexandra Road, Parkstone, Dorset.
 Pickering, F. S., The Gables, Chapel Street, Lye, Stourbridge.
 Richards, W. P., Hill, Blackheath, Birmingham.
 Roberts, E. J., Bryn Maenol, Penygroes S.O., Carnarvonshire.
 Slack, A. J., School House, Wetley Rocks, Stoke-on-Trent.
 Stott, J. P., 15 Clarendon Road, Swinton, Manchester.
 Thompson, A. V., 15 Lower Hill Street, Wisbech.
 Tyrrell, E. (Miss), 48 Roberts Road, Wadham Road, Waltham-stow.

193. { Warburton, W. H., 40 Barnfield, Penkhull Garden Village,
Stoke-on-Trent.
- { Warren, H. C., 2 Tudor Road, Kingston Hill.
- { Withers, W., 59 Cartington Terrace, Heaton, Newcastle-on-Tyne.
- { Blaxley, A. (Miss), Ardleigh, 21 Victoria Road, Milton Regis, Kent.
- { Boothman, B. J. (Miss), Lidgate, Newmarket.
- { Browne, C. L., 38 Chelmsford Road, Leytonstone, E.
- { Butterworth, S. E. (Miss), 14 Brinton Terrace, Hanson Lane,
Halifax.
- { Clarke, A. F., School House, Shamley Green, Guildford.
- { Cooper, J. C., 37 Old Fillebrook Road, Leytonstone.
- { Crabbe, H. C., Palace Green, Ely, Cambs.
- { Delorme, L., Dean's Orchard, Mere, Wilts.
- { Druitt, H. H. W., The School House, Bishopstone, Salisbury.
- { Duckmanton, B. W., Sherwood, Bakewell, Derbyshire.
- { Farrand, J., 1 Norman Road, Stalybridge, Manchester.
- { Flavill, H., Pontcanna, Hinton Avenue, Cambridge.
- { Greenfield, B. A., 25 Tottenhall Road, Palmer's Green, N.
220. { Helme, M., 42 Gladstone Road, Chester.
- { Herbert, J., Lime Avenue, Huthwaite, Mansfield.
- { Hoff, E., 125 Nantwich Road, Crewe, Cheshire.
- { Jones, R. W., 36 Davies Street, Porth, Glam.
- { Kemp, E. J., Kerrison School, Thorndon, Eye, Suffolk.
- { Masters, F., South View, South Petherton, Somerset.
- { Page, J. W., School House, Fishlake, Doncaster.
- { Rayson, W. D., 19 Bewlay Street, York.
- { Ryall, W. J., 35 Lower Stockbridge Road, Winchester.
- { Sagar, O., 7 Sutcliffe Street, Briercliffe, Burnley.
- { Smith, H. E. W., School House, Soberton, Bishop's Waltham.
- { Swift, J. A., 46 Franklin Road, Bournville, Birmingham.
- { Symonds, C. H., 89 Jeffcock Road, Wolverhampton.
- { Taylor, Miss D. H., 80 Oakfield Road, Cannon Hill, Birmingham.
- { Waterhouse, J. L., 7 Colborne Street, Newton-le-Willows, Lancs.
- { Wilkinson, H., 58 Church Street, Shildon, Co. Durham.
- { Barron, F. J., 14 Chaucer Street, Westcott Street, Hull, Yorks.
- { Bishop, E., 8 Ashburnham Road, Tonbridge.
- { Calvert, H., Naburn, York.
- { Carpenter, F. E., Prickwillow School, Ely, Cambs.
- { Collier, J. F., 83 Ronver Road, Lee, S.E.
- { Conley, M., Town Hall, Kildare, Ireland.
- { Fisher, H. W., 2 Lee Road, Dovercourt, Essex.
249. { Gardiner, S., Cheltenham Road, Kingswood, Bristol.
- { Hayward, W. H., 82 The Butts, Frome, Somerset.
- { Hicks, F., 96 Earlsbrook Road, Redhill, Surrey.
- { Hopkinson, E., School House, Newstead, Notts.
- { Hurlstone, W., 15 Whitehall Road, Halesowen, Birmingham.
- { Lofthouse, Miss A., 11 Gladstone Street, Brotton S.O., Yorks.
- { Martin, F., 75 Florence Road, Maidstone.
- { Milner, L., 103 Marsala Road, Lewisham, S.E.

- Mumford, H. L., Grayswood, Haslemere, Surrey.
 Nash, C. D., 10 Phoebeth Street, Brockley, S E.
 Neale, J. H., Keeper's Lodge, Enderby, Leicester.
 249. Noble, H. W., 44 Ashgrove Road, Goodmayes, Ilford, E.
 Owen, H., Council School, Llansadwrn, Menai Bridge.
 Thompson, A. G., School House, Wimbish, Saffron Walden.
 Walker, W., School House, Ulceby R.S.O., Lincs.
 Wayment, F. E. (Miss), 70 Edenbridge Road, Bush Hill Park, N.
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 Bower, E., 88 Balfour Road, Darnall, Sheffield.
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 Branford A. S. (Miss), Wissett, Halesworth, Suffolk.
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 Burrell, F., Thornton-le-Moor, Northallerton.
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 Edwards, W. W. School House, Trekenner, Lezant, Launceston.
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 Hinde, W. G., 25 Midland Road, Olney, Bucks.
 Holder, D. E., 22 West Street, Stillington, Ferry Hill, Co.
 Durham.
 272. Jeffreys, E., Ceinfan, Forestfach, Swansea.
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 Lancs.
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 Stewart, W., Langar, Nottingham.
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 300. Swann, H. T., Rowstock, 38 King's Road, Horsham.
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 Barnet, H. V., Greystoke, March, Cambs.
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 Harrison, H. (Miss), 12 Queen Street, Cheadle, Staffs.
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 Howard, B., The School House, Weasenham, Norfolk.
 320. Hunt, P. F., The School House, Higham, Bury St. Edmunds.
 Jones, W. E., Llŷs Owain, Penmachno, near Bettws-y-coed,
 Carnarvonshire.
 Lewis, E. H., Abington, Cambridge.
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 Poppy, F. H., Beulah Villa Willingham, Cambs.
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 Ashwell, F., 182 Ampthill Road, Bedford.
 Atkinson, J. G., York Road, Church Gresley, Burton-on-Trent.
 Bown, E. E., 1 Vicarage Street, Earl Shilton, near Hinckley.
 347. Bramall, J., Weston School House, Crewe.
 Corbett, C. H., Palgrave, Diss, Norfolk.
 Figgis, R. L. (Miss), 37 Crown Terrace, Richmond, Surrey.
 Gough, J. S., 32 Granville Road, Wavertree, Liverpool.
 Green, F., 16 Wilberforce Road, Wisbech.

- Gregory, T. G., 45 Beaconsfield Avenue, Colchester.
 Harvey, H. D. (Miss), School House, Blundeston, Lowestoft.
 McPhail, D., 75 Midland Road, Wellingboro', Northants.
 347. Phillips, G., Nichell Cottage, Portobello, Wolverhampton.
 Rhodes, A. R., 18 Tylney Road, Park, Sheffield.
 Sleep, J. H., Goldsworthy, Gunnislake, Tavistock.
 Sleep, R. F., Fleetwood, Fleet Street, Beaminster.
 Abrams, W., Florence Villa, Love Street, Herne Bay.
 Baker, A. E., 36 George Street, Markyate, Dunstable.
 Blackshaw, F. P., 17 Furlong Road, Bolton-on-Dearne.
 Blight, A. H., 24 Harvest Road, Englefield Green.
 Brown, C. J., Woodcroft, Swanley Junction, Kent.
 Elcock, E. E., "Glyndon," Belmont Road, Penn, Staffs.
 Guest, J. J., 5 Bowen Street, Parkfield Road, Ettingshall, Staffs.
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 Markland, G. T., School House, Warwick Bridge, Carlisle.
 Owen, G., Preswylfa, Bala, Merioneth.
 363. Pepper, G., 17 Harold Street, Bingley, Yorks.
 Phillips, J. V., The Bank, Scholar Green, Stoke-on-Trent.
 Pring, B. V., 36 Torridge Road, Thornton Heath.
 Roberts, L. (Miss), Penisa, Dyserth, Flints.
 Roe, J., Debden School House, Saffron Walden.
 Rosser, T. H., Salter Street, Berkeley, Glos.
 Scoble, S., Great Gate Farm, Loddiswell, S. Devon.
 Scoltock, B., "Elmhurst," Dawley, Salop.
 Shaw, C. W. B., 3 Spawood Top, Primrose Hill, Huddersfield.
 Watson, G. W., "Kilwinning," Park Farm Road, Kingston-on-Thames.
 Woods, A. H., "Hazeldene," Highbridge Road, Aylesbury.
 Woolnough, F. U., Thorncombe, Chard, Somerset.
 (Bridgewater, E. J., 128 Trentham Road, Penkhull, Staffs.
 Clifton, H. (Miss), Heath End, Nuneaton.
 Deeson, L. A., 22 Lascotts Road, Wood Green, N.
 Dwight, F. W., 14 Walsall Road, Willenhall, Staffs.
 Garner, F. E., 32 Penn Street, Oakham, Rutland.
 Green, L., Kexby, Gainsborough, Lincs.
 Harris, M. (Miss), Church Cottage, Tadmarton, Banbury.
 Heard, J. W., 8 Peter Street, Yeovil.
 387. James, J. M. G., 5 Greenfield Terrace, Cwmbach, S. Wales.
 Jones, J. S., 177 High Street, Lewisham, S.E.
 Jones, W., School House, Southminster.
 King, W. S., 9 Nevilledale Terrace, Durham.
 Kirkby, H. W. M., 2 Cleveland View, Moor Top, Ackworth.
 Lowe, A. W., 25 Desborough Road, Eastleigh, Hants.
 Miller, A. D., Aros, *via* Oban.
 Preston, A. J., High Street, Burford, Oxon.

- Rowlands, D. J., Fourcrosses C. School, Chwilog, R.S.O., Carnarvon.
387. Staton, S., 7 Stanhope Road, Intake, Sheffield.
 Tamblyn, H. C., Blue Anchor, Fraddon, Cornwall.
 Tiller, C., 47 De Vere Gardens, Ilford.
- Abbott, W. H., High Street, Ringstead, Thrapston.
 Barrett, T., County Industrial School, Cockermouth.
 Blair, G. H., Bozane, Praze, Cornwall.
 Clegg, A. P., St. Ives House, Leadgate, Durham.
 Gunn, R., 29 Fenton Terrace, New Herrington, Durham.
 Harradon, W. T., 51 Chelston Road, Newton Abbot.
 Hemming, A. H., 16 Thorn Road, Bournville.
 Jago, P., Elm Villa, Earls Colne, Essex.
 Johnson, A. E., 8 Belmont Grove, Prestwich.
 Jones, G. H., Primrose Lane, Killamarsh.
407. Kenwright, F. H., 109 Clock Face Road, St. Helens.
 Knight, E. H., 26 Cardiff Road, Luton.
 Kipps, J., 98 Whitby Road, Bradford, Yorkshire.
 Middleton, W. H., 26 Blakenall Lane, Bloxwich, Walsall.
 Munro, J. M., Promenade Street, Heywood.
 Peters, C. F., Milton Road, Swanscombe, Kent.
 Quick, E. J., Yelling, St. Neots, Hunts.
 Stewart, W. A., 84 Edge Lane, Liverpool.
 Townsend, J. A., School House, Bunny, Notts.
 Tuck, A. T., 17 Hythe Road, Preston Park, Brighton.
 Whitaker, E. J., School House, Wolviston.

Class III.

- Adams, T. R., Hall Road, Cheltenham.
 Boulter, S. G., High Street, S. Ockendon, Romford.
 Busby, F. W., London Road, Aston Clinton, Tring.
 Cocks, C. J., St. Clements, Hawkwell, Hockley, Essex.
 Eden, C., Grendon, Northampton.
 Gascoyne, H., Norbriggs, Chesterfield.
 Gillard, P. C. S., 26 Brentry Road, Fishponds, Bristol.
 Habgood, T., 2 Woodside, Sipson, Plymouth.
 Hitchens, A. E., 78 Frensham Road, Southsea.
1. Jones, H. W., 4 View Terrace, Ebenezer, Cwmyglo, S.O.
 Keen, Miss S. A., Wilton C.E. School, Pickering, Yorks.
 Leigh, F., 69 Oak Road, Crumpsall, Manchester.
 Mapley, C. J. (Miss), Fernleigh, Warwick Street, Daventry.
 Philipps, R. H., Sycamore Cottage, Brimington, Chesterfield.
 Revell, G. F., Gorefield, near Wisbech, Cambs.
 Rowland, T. J. S., 8 Barking Road, East Ham.
 Underhill, C. C., Fair View, St. Thomas's Hill, Canterbury.
 Watson, C. E., c/o Mrs. Freeman, Bexwell Rd., Downham Market.
 Watson, T., 11 St. Hilda's Road, Hexham.
 Wayles, J., Chase Terrace, near Walsall, Staffs.

1. { Wood, A. T., 4 Sheppard Street, Stoke-upon-Trent.
 { Yardy, E. G., Wimblington, near March.
 { Atherton, H., Crook Lane, Wharton, Winsford, Cheshire.
 { Bayes, G., 17 Harcourt Street, Raunds Wellingborough.
 { Blenkinsop, R. W., Front Street, Neville's Cross, Durham.
 { Chalmers, F., 21 Butlers Road, Ryde.
 { Clare, W. H., The Nook, 3 Kinver Road North, Sydenham.
 { Davies, L. H., c/o Mrs. Price, Ivydale, Gresford.
 { Davison, H. A., 6 School Terrace, Stanley, S.O., Durham
 { Dickinson, R. W., Milborne Port, Sherborne, Dorset.
 { Duncan, J., Cavendish, Ulundi Road, Johnstone, N.B.
 { Dunton, J. A., Hurst Hill, near Bilston, Staffs.
 { Eden, H., Pyneleigh, George Street, Dunstable.
 { Evans, A. L., Arfryn, Holywell, N. Wales.
23. { Gilman, W. H., 115 Gilman Street, Hanley, Staffs.
 { Harris, J. H., 65 St. John's Rd., Whittington Moor, Chesterfield.
 { Jackson, F., 56 Percy Street, Nelson.
 { Jones, D. E., Ivy Cottage, Kerry, near Newtown, Mon.
 { Jones, R. L., Council School, Trevor, Chwilog, S.O.
 { Lockyear, H. C., 19 School Street, Thurnscoe, Rotherham.
 { Morris, D., Beech House, Kington, Herefordshire.
 { Naylor, A. H., Skegby Lane, Sutton-in-Ashfield.
 { Neville, G. H., Park View, Armitage, Rugeley.
 { Pate, G., Hillsden, Douglas Road, Melrose, N.B.
 { Sambrook, A. W., Ivy House, Great Wyrley, Walsall.
 { Whiting, M. F., Elmstead School, Colchester.
 { Youngs, W. H., 20 Dogsthorpe Road, Peterborough.
- { Blackmore, A. C., Gale House, King's Hill, Wednesbury.
 { Broadhead, A., Aspen House, Skelmanthorpe, near Huddersfield.
 { Burbidge, C., 45 Desborough Road, Eastleigh, Hants.
 { Clark, C., The School House, Funtley, Fareham, Hants.
 { Coller, A. W., 110 Belgrave Road, Oldham, Lancs.
 { Farrant, C. E., 7 Acris Street, Wandsworth, S.W.
 { Heesom, H., 121 Bath Street, Ilkeston.
 { Holcombe, H. J., 7 Belvedere Road West, Taunton.
 { Jackson, J. B., 1 Moresby Terrace, Parton, Whitehaven.
 { Johnson, S., 176 Fartown, Pudsey, Leeds.
48. { Kelly, E. W., Landrake, St. Germans, Cornwall.
 { Kerley, G., 35 Ellesmere Road, Dollis Hill, N.W.
 { Knight, C. E., High Street, Uppingham, Rutland.
 { Maude, G. W., Wantage Hall, Reading, Berks.
 { Osborne, A., 1 Segmere Street, Cleethorpes, Lincs.
 { Parker, E. C., 63 Edmund Road, Saltley, Birmingham.
 { Perry, W., Brimscombe, Stroud, Glos.
 { Ramsdale, E. (Miss), 67 Westbourne Road, Handsworth, B'ham.
 { Speakman, C., Marsh Lane, Sheffield.
 { Taylor, C. H. (Miss), 47 Lea Road, Wolverhampton.
 { Watts, G. E., Stanton Harcourt, Eynsham, Oxon.

48. { Wilcox, H. J., Hill Front, Elham, Canterbury.
 Williams, R. R., Llanddona C. School, Beaumaris, Anglesey.
 Burgess, C. A., 8 Grange Terrace, Leeds.
 Cadman, J. S., 4 Brettell Lane, Stourbridge, Worcester.
 Collett, D. P., Higham, Tatnam Road, Poole, Dorset.
 Crane, F. C., Southrepps, Norwich.
 Dodson, W. A., c/o Mrs. Stannett, Church Street, Burnham,
 Bucks.
 Evans, H. J., 192 Gillingham Road, Gillingham, Kent.
 Irvén, J. G., 12 Manor Road, Leyton, E.
71. { Jones, G. R., Cefndon, Hirwain, Glamorganshire.
 Jones, T. O., Berwyn, Vaynol Road, Carnarvon.
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 Plant, W., School House, Hayes, Kent.
 Rawling, T. J., Hollins, Ennerdale, Cleator, Cumb.
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 Williams, J., Cryd-yr-Awel, Camrose, Pembrokeshire.
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 Glastonbury, H. M., 158 Hartfield Road, Wimbledon.
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 Jones, J. G., Mountain View, Cymman, Wrexham.
87. { McIntosh, J. F., Glascote Council School, Tamworth.
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 Steggall, G. E., Braeside, Needham Market.
 Thomas, D. J., Glynea Ho., Bynea, Llanelly, Carmarthenshire.
114. { Brant, M. E. (Miss), 36 Bickford Rd., Fallings Park, Wolverhampton.
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- Claxton, E., School House, Earith, Hunts.
 Deal, W. J., West Bergholt, Colchester.
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 Parsons, T. G., 13 The Quay, Appledore, Devon.
 114. Rowlands, J. C., 3 Mountain View Terrace, Menai Bridge, Anglesey.
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 Taylor, F. C., 150 Raddle Barn Road, Selly Oak, Birmingham.
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 Towler, Frank E., Watts Naval Training School, Elmham S.O., Norfolk.
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 136. Frost, W. P., Rose Cottage, Church Tysoe, Kineton.
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- Davies, I. C., Garthowen, Deganwy.
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 Watton, W. L., The Schools, Rudgwick, Horsham.
 Williams, R. O., 5 Regent Street, Bangor.
 Derbyshire, E., 445 Worsley Road, Patricroft, Manchester.
 Hollis, W. H., Morsley Cottage, Catherine Avenue, Ilkeston.
 Lapper, A., 24 Emberton Street, Wolstanton.
 Lovett, R. F., 13 Clifton Road, Askew Road, Shepherd's Bush, W.
 181. May, J. R., 35 Auckland Terrace, Kingston-on-Thames.
 Priest, N., Tealby, Lincoln.
 Savage, W., Tudor Street, Sutton-in-Ashfield.
 Stevens, W., Field House, Amblecote Road, Brierley Hill.
 Wood, Percy, Melfort, Mynydd Isa, Mold.
 Backhouse, J. B., 29 Florence Terrace, Gainsborough.
 Berry, S. G. M. (Miss), 82 Mornington Road, Bolton.
 Briggs, J. T., Heatherbank, Littleborough.
 Fry, P. E., 40 Tytherton Road, Tufnell Park, N.
 Hare, G. F., 73 Sydney Street, Boston.
 Hayes, T., 15 Woodland Villas, Chingford Road, Chingford.
 Helme, M., Church Cottage, Montgomery.
 Nettleton, A., 14 First Avenue, Heworth, York.
 Parrott, F. W., 11 Pembroke Street, Bedford.
 190. Roberts, S., Council School, Llanfair P.G., Anglesey.
 Rowe, R. E., Creswell, Stafford.
 Scott, F. E., 35 Coquet Street, Jarrow-on-Tyne.
 Share, A., 44 Upper Ettingshall Road, near Bilston.
 Smailes, G. S., School House, Rowlands Gill, Co. Durham.
 Tolcher, W. W., Fair View, Norton Sub Hamdon, Som.
 Tupman, A. E., Kelvedon House, London Road, Greenhithe.
 Turner, L. T. D., Parson Drove, Wisbech, Cambs.
 Watkins, M. E. (Miss), St. George's Hostel, Reading.
 Webber, J., Rose Cottage, Sampford Peverell, Tiverton.
 Willis, W. F. B., 16 Stanton Road, Wimbledon, S.W.

- Bird, E. R., Glenmore, The Avenue, S. Lowestoft.
 Brightwell, E. L., Lyndhurst, 2 Glassbrook Road, Rushden.
 Burrows, J. T., School House, Weeton, Leeds.
 Davies, W. E., Abdon School, Munslow, Craven Arms, Salop.
 Gould, J. W., 63 Brunswick Road, Sheffield.
 Harrison, E., 22 Broughton Road, Lodge, Brymbo, nr. Wrexham.
 Ibbotson, C., Blue Coat School, Psalter Lane, Sheffield.
 Jenkins, A. E., Eirianfa, Coedpoeth, near Wrexham.
 Lowe, W. H., 43 Torkington Street, Edgley, Stockport.
 210. McCann, J., 192 Crescent Road, Gt. Lever, Bolton, Lancs.
 Moore, G., Holly Grove, Bagnall, Stoke-on-Trent.
 Pilling, H., West Holme, Bingham, Notts.
 Reed, F., 55 Melton Road, Wellingboro'.
 Seward, H. H., School House, West Hyde, Rickmansworth.
 Skan, K. (Miss), Llanbadarn Fynydd, near Penybont, S.O.,
 Radnor.
 White, W. H. S., 93 Ranelagh Road, Felixstowe.
 Wright, M., 59 Winsham Grove, Clapham Common.
 Wyatt, J. C., Field Farm, Barlestone, Nuneaton.
 Corbett, G., Cot Lane, Kingswinford, Dudley.
 Hazeldine, E. W., 38 Thorpe Street, Raunds, near Wellingboro'.
 Marsden, F. K., Colli Burn, Wylam Terrace, Stanley, S.O.,
 228. Durham.
 Mason, C. F., Ripley, near Christchurch, Hants.
 Poole, E. (Miss), Leek Road, Endon, Stoke-on-Trent.
 Wright, H. J., 15 Tuam Road, Plumstead.
 Bell, M. C., Meadow View, Sacriston, Durham.
 Brooker, R. A. G., Howard Cottage, Ashted, Surrey.
 Garner, R. L., 86 West Street, Farnham, Surrey.
 Heatley, S. F., 11 Hughwood View, Durham.
 Law, E. F., 54 Dogsthorpe Road, Peterborough.
 Lillico, W. N., 13 Togston Crescent, North Broomhill, Acklington,
 Northumberland.
 Meek, H. G., Brooke House, Parkend, Lydney, Glos.
 234. Overton, W. H., Grammar School House, Woodstock, Oxon.
 Phillip, J. H., Greens Norton Schools, Towcester, Northants.
 Pye, W. H., Bedeville, Holywell Avenue, Monkseaton, Whitley
 Bay.
 Rice, C. H., Bridge House, Earl Soham, Framlingham, Suffolk.
 Stone, R. A., Knightsbridge Farm, Shirburn, near Watlington,
 Oxon.
 Waterfield, J., Station Street, Chatteris, Cambs.
 Wynn, A. H., Hope Cottage, Bradley, Bilston.
 Brindley, J., Bradshaw House, Baddeley Edge, near Milton,
 Staffs.
 248. Brown, A., School House, Brill, Bucks.
 Dodd, B. R. F., 29 Bridewell Street, Devizes.
 Haggarty, J. (Miss), Badcant School, Ullapool, Ross-shire.

- Higgins, A. E. B., North Wall Laundry, The Butts, Worcester.
 Jackson, A. A., 18 Littlemoor Road, Mirfield.
 Little, T. W., School House, Bamburgh, Northumberland.
 Martin, F. H., Willoughton School, Lincoln.
 248. Olliff, W., 2 Lyn Vale, Bath.
 Page, C. F., 6 Surrey Grove, Norwich.
 Richards, B. E. (Miss), Trentishoe, High Street, Tewkesbury.
 Smith, H., 42 Newton Street, West Bromwich.
 Vernon, B., Post Office, Old Hednesford, Stafford.
 Alport, E., 42 Swarland Terrace, Broomhill, Acklington, North-
 umberland.
 Archer, H. A. (Miss), 12 Park Road, Raunds.
 Bishop, H. P., Glen Leigh, Lydbrook, Ross-on-Wye.
 Foster, R. E., 6 Northfield Terrace, Uppingham, Rutland.
 Johnson, G. H., Eversley House, Brooke, Norwich.
 Kear, I. E., Market Street, Cinderford, Glos.
 261. Lockwood, B., The Lodge, Bamford, Sheffield.
 Nixon, C. (Miss), Harringworth, near Kettering, Northants.
 Perry, R., School House, Minchinhampton, Glos.
 Shearson, G. L., Halton, Lancaster.
 Stannard, S. C., 2 Victoria Cottages, Rochford, Essex.
 Tongue, A. L., 12 King's Road, Kingston-on-Thames.
 Walkey, C. E. J., Edgborough, Staplegrove, Taunton.
 Worfolk, H., Boat Yard, Parkgate, Rotherham, Yorkshire.
 Anderson, W. N., 82 Meldon Terrace, Heaton, Newcastle-on-Tyne.
 Bennett, H., 167 Huddersfield Road, New Hey, near Rochdale,
 Lancs.
 Cuffling, S. H., St. Peter's, Station Road, Marlow, Bucks.
 Dent, F. W., 23 Burghley Road, Leytonstone, N.E.
 George, D. (Mrs.), The Croft, Hextable, Kent.
 Gilliat, F., 25 Cunliffe Street, Edgeley, Stockport.
 Hughes, J. H., 19 Church Road, Buckley, near Chester.
 Jagger, F. A., 45 Victoria Crescent, Barnsley, Yorkshire.
 275. Jones, E. M., Pant-y-Rhedyn, Gwalchmai Valley, R.S.O.,
 Anglesey.
 Mead, A. G., Wellington College, Salop.
 Owen, W. A., Kingsley Moor, near Cheadle, Stoke-on-Trent.
 Simmons, H. V., Meadow View, Sacriston, Durham.
 Skidmore, J. (Miss), Butterton, Newcastle, Staffs.
 Sparshott, J. F., 170 Avenue Road, Itchen, Southampton.
 Spooner, S. C., St. Nicholas-at-Wade, Birchington, Kent.
 Tibbetts, W. C., Stoneleigh, Springfield, near Dudley.
 Goodson, W. C., Hutton Roof, Kirkby Lonsdale, Westmorland.
 Griffiths, A. M. (Miss), School House, Haughton, Stafford.
 291. Hall, A., Roseneath, Seaton, near Workington, Cumberland.
 Hawkins, H. H., St. Luke's College, Exeter.
 James, E. L., 79 Larkhall Rise, Clapham, S.W.
 Jones, G. E., Min-y-Nant, Waenfawr, Carnarvon.

- Kershaw, R. A., 37 Badminton Grove, Ebbw Vale, Mon.
 Lloyd, H. F. (Miss), 163 Holly Hall, Dudley.
 Lockwood, F., 57 Southern Road, Milnsbridge, Huddersfield.
 Maybury, J. W., Leeds Reformatory, Adel, near Leeds.
 291. Owen, H. G., 59 Rostrevor Road, Munster Park, S.W.
 Skinner, W. J., 18 Albion Street, Murton, Durham.
 Turner, T. E., The Roost, Brereton, Rugeley, Staffs.
 Whetter, W. G., 36 Fernhill, Newquay, Cornwall.
 Briggs, E. L. (Miss), New Road Girls' School, Chatteris, Cambs.
 Davies, T. H., Penffordd School, Narberth, Pembs.
 305. Julian, W., Simbur Place, Cardenden, Fife.
 Mason, E. C. (Miss), 45 Lawrence Lane, Old Hill, Staffs.
 Taylor, F. G., 43 Keswick Road, St. Helens, Lancs.
 Wightman, J., 11 Cardiff Road, Troedyrhiw, Glamorgan.
 Hodgson, J. (Miss), 4 Ivy Cottages, Little Stukeley, Huntingdon.
 Hopkinson, E. (Miss), 10 Highfield Terrace, Wyke, Bradford,
 Yorkshire.
 James, F., 12 Wilmington Avenue, Chiswick, N.
 Lodge, A. H., Oakland, Bramhall Moor Lane, Hazel Grove,
 Stockport.
 311. Pinkett, C. B., 280 Grand Parade, Haringay, N.
 Sutcliffe, H., Doddington Road, Earls Barton, Northampton.
 Wardle, C. L., Port Vale House, Longport, Stoke-on-Trent.
 Webb, T. R., South Place, Daventry, Northants.
 Whitney, C. W., 4 Station Road, Chatteris, Cambs.
 Willis, F. R., 36 Woodfield Road, Braintree, Essex.

BOOK REVIEWS.

"Garden Craft in Europe." By H. Inigo Triggs. La. 8vo., 332 pp. (B. T. Batsford, London, 1913.) £1 15s. net.

This is a very handsome book, well printed on art paper, copiously illustrated and stoutly bound in an attractively designed cover.

The subject is a comprehensive one, for the author tells us about garden craft in Europe from the earliest ages when Greek and Roman were laying the foundations of an art that has always appealed most strongly to the succeeding nations as they have progressed in civilization.

The reader in turning over the leaves will not fail to be struck with the elegance and artistic nature of many of the illustrations. The frontispiece is a fine portrait of that prince of French gardeners, the great Le Nôtre; and one or two other portraits of celebrated garden designers such as "Capability" Brown, Humphrey Repton, Jan Vredeman de Vries, are not less interesting. About a dozen full-paged plates, mostly views in famous gardens, are reproduced in colotype adding beauty to the general excellence of the illustrations that are profusely inserted throughout the work. There are approximately three hundred of these, done in photogravure or similar process and consisting of garden plans, views of historic gardens and a variety of vases of artistic design, and the many accessories connected with the embellishment of gardens at home and abroad. Some quaint reproductions of garden scenes from medieval manuscripts, "The Romaunt of the Rose," "The Grimani Breviary," &c., are also included.

The text is divided into eleven chapters in which the author discourses in a most attractive manner upon the ancient gardens of Europe, passing on to a review of those of the Middle Ages. The chapter on Italian gardens forms by no means the least interesting portion of the volume to the reader who has had the joy of wandering through them, or some of them. We note especially the pictures and references to the gardens of the Vatican, Boboli, the Villa Castello, Villa Marlia, Villa Caprarola, Villa Lante, &c., but of course those who wish for fuller information upon this subject will turn to the much more important work by Mr. Triggs published a few years ago, a grand folio, bearing the title of "The Art of Garden Design in Italy."

Nearly a hundred pages are devoted to a consideration of the French gardens of the sixteenth and early seventeenth centuries and an entire chapter is given on Le Nôtre and Versailles. The gardens at Fontainebleau, Vaux-le-Comte, Chantilly, Versailles with the Trianons, Meudon, Marly, St. Cloud, and others receive liberal treatment which will be highly appreciated by the critical reader. We have only one little criticism at this point to make, and that is that our author

erroneously states, on page 222, that London and Wise published "The Retired Gardener," which is a translation of "Le Jardinier Solitaire" by the Sieur Louis Liger of Auxerre. This is certainly not the fact. "The Retir'd Gard'ner" by London and Wise is a translation of *two* French books, "Le Jardinier Solitaire" by Dom Gentil, a Carthusian monk known as Frère François, and "Le Jardinier Fleuriste" by Louis Liger. Both books were enormously popular in France and for many years enjoyed a high degree of public favour there.

We can only briefly indicate the nature of the remaining portion of the work now before us. Garden design in the Netherlands occupies over forty pages and there are some very quaint reproductions given of Dutch gardens as they appeared in the Middle Ages.

A review of German and Austrian gardens follows; then we have a chapter on Garden Design in Spain. The English landscape school and its influence on the Continent also receive treatment, the whole work forming a veritable mine of information, literary, historic and artistic, upon gardens in all times and in all European countries.

At the end of the volume which we leave with some little reluctance is a bibliography of the most important books that have been published on garden craft in Europe and the final pages are devoted to a capital Index to the text and illustrations.

We have much enjoyed Mr. Triggs' latest addition to horticultural literature as we are confident many of our readers will when they become the possessors of this very valuable and interesting volume. It can be strongly recommended as a standard work for the shelves of any Horticultural Society's library.

"Researches on Irritability of Plants." By J. C. Bose, M.A., D.Sc., C.S.I. With 190 illustrations. 8vo., 376 pp. (Longmans, London, 1913.) 7s. 6d. net.

Dr. Bose is well known from his previous works on Plant-response. The present volume is a further contribution on the same subject, but treated by means of new methods and scientific implements, by the aid of which not only was "light thrown on many obscure problems, but also discoveries of several important and new phenomena were made." The work contains twenty-six chapters, each replete with results of experiments, intensely interesting to scientists.

Response of plants is seen externally in many ways, as by turning to the sun, transpiration of water, &c., but it is to the *internal* effects, not perceptible to the eye, that Dr. Bose has turned his attention. Of the numerous problems to be solved are those to discover if the responses of vegetable protoplasm are essentially the same as in animals; for in both "plant and animal alike there is the occurrence of a fundamental excitatory protoplasmic change which finds external expression in alteration of form."

Having described the mechanism of his new "Resonant Recorder," Dr. Bose gives the methods of stimulation, sent as a mechanical blow,

chemical agents, thermal and electrical excitements, &c. The plant used was the sensitive *Mimosa pudica*. Besides quantitative movements, time relations were investigated; thus the normal maximum rate of movement was found to be 50 mm. per second. Temperature enhances the rate.

"By means of electric response, it may be shown that every plant, and every organ of the plant, is sensitive and responds to stimulation by a definite electric change. The sensitiveness of *Mimosa* to electrical stimulus is high, and may even exceed that of a human subject."

Dr. Bose shows also the "Influence of Load" and the "Work performed by the Plant:" that the recording response is greater in proportion to the weight, and that if W_1, W_2, W_3 indicate increasing weights, and h_1, h_2, h_3 the corresponding heights of response, then $W_1 h_1 < W_2 h_2 > W_3 h_3$; "in other words, the work performed is increased under enhanced load and increasing tension."

Though not alluded to, this corresponds with the *visible* effects; for if a young petiole be weighted, there will be found a considerable increase in the amount of mechanical tissues when full grown, over that of a normal petiole, which only supports the blade.

Space will not allow a detailed description of the book; but the above will reveal the importance of this work to all interested in vital phenomena.

"Plants and their Uses: An Introduction to Botany." By F. L. Sargent. With numerous illustrations. 8vo., 610 pp. (Holt, New York, 1913.) \$1.25.

This is an excellent treatise on useful plants, with an abundance of illustrations. After a preliminary chapter on The Study of Plants, the author deals with cereals, various food plants, flavouring, and medicinal and industrial plants.

Chapter VII. deals with Classification, &c., so as to introduce typical natural orders with useful plants.

Now we must turn to what seems to us to be quite superfluous and troublesome. Pp. 404-427 contain formulæ of some 270 or more genera indicated by letters and symbols. Thus for example:

Clematis.— $CE \infty, o Eie2 + T \quad Cj < \infty EI G-N.$

When we remember that there are four sepals, no corolla, ∞ stamens, ∞ carpels; all parts *free*; we do not see the use of the above.

Discussing different views as to the origin of species, the author offers a new factor, "choice." "A living thing is active as well as passive. The idea is thus suggested that organic evolution may have as its controlling factor some power of choice, essentially like our own, residing in all living organisms—a will as truly free."

The fallacy underlying this idea is that the author does not appear to perceive the differences between "automatism" and "free will." It is accepted that man alone has the latter and can "choose," and that no other being can do this, but acts *automatically* under the

directivity of life, for it can *not be conscious* of any *abstract idea*. It cannot think "This is I," nor *consciously weigh* the merits or demerits of things so as deliberately to "choose," but responds to whatsoever impulse comes from without.

Taking the book as a whole, it is a valuable one for students.

"Weeds: Simple Lessons for Children." By R. Lloyd Praeger. 8vo., x + 108 pp. (University Press, Cambridge, 1913). 1s. 6d. net.

Weeds have been receiving considerable attention of late from writers and legislators alike, and this little book of nature-study of weeds is a welcome addition. It is intended for the guidance of children's studies, not as a manual for the farmer or gardener, and as such it is admirable. The author describes most of the common "plants which grow in places where man does not want them to grow" and shows how they come to invade the fields and pastures, and at the same time gives an interesting and accurate account of the manner of life of plants. The illustrations are numerous and well chosen to illuminate the text and add to the interest of the reader.

"With Camera and Rucksack in the Oberland and Valais." By R. A. Malby. 8vo., 310 pp. (Headley, London, 1913.) 10s. 6d. net.

This book is hardly a gardening book. It contains a description of Mr. Malby's two visits to Switzerland, undertaken mainly with a view to studying alpine plants in their natural habitat. For the ordinary tourist Mr. Malby's wanderings in well-known parts of Switzerland do not present any features of novelty, but for the cultivator of alpine plants the book is of interest, very much enhanced by the excellent photographs, coloured and plain, showing studies of rock plants. Mr. Malby's remarks on the building of rock gardens, based upon his observations in the Alps, are much to the point. Alpine plants do not naturally grow on rocks which show stratification, but where accumulations of soil and detritus have settled on Alpine slopes among the rocks.

"The Violet Book." By A. and D. Allen-Brown. 8vo., 109 pp. (Lane, London, 1912.) 5s. net.

There are not too many books on the Violet, and this volume is a most useful addition to the literature on this esteemed flower. We have only one objection to the information given in the book, and that is where the authors on p. 41, under the heading of October and November, state "The time has now arrived when preparation must be made for the reception of those plants which are to be moved into homes for the winter season." This is followed by excellent instructions on how the work should be done, but in our opinion

October and November are too late to plant Violets in frames, even if ever so carefully planted. We find early in September the best time to plant in frames, as the roots get well established before the winter, and abundant flowers are produced from October onwards. Otherwise we must strongly commend this carefully-written book to Violet-growers in large and small gardens. The matter is thoroughly practical, and if the advice given is strictly followed out there will be no difficulty in obtaining abundance of these sweet little flowers through the winter where the atmosphere is pure. It is interesting to note how greatly the Violet was esteemed by Greeks and Celts, and the younger Pliny, describing the villa he built for himself near the shores of the Tuscan Sea, says: "Before the gallery lies a terrace perfumed with Violets." Another interesting remark in the book is that "In 1564 the first mention of double Violets is made by Rombert de Dodome." Does this mean Rembert Dodoens?

"Gardening." By A. Cecil Bartlett. 94 pp. (Jack, London, 1913.) 6*d.* net.

A well-written little book, dealing with the chief garden operations in a brief manner. The author has done well to cram so much information on garden-making, soil, manures, seeds, planting, lawns, propagating, pruning, enemies and diseases, &c., into such a small compass. The printing is good, and an index finishes the book.

"The National Rose Society's Rose Annual for 1913." Edited by E. Mawley. 8vo., 239 pp. (E. Mawley, Berkhamsted, 1913.) 2*s.* 6*d.* net.

All who grow Roses should get this volume from the Hon. Secretary, Mr. Edward Mawley, Rosebank, Berkhamsted, as it is the most interesting and instructive annual we have seen. Its value is greatly enhanced by the Report of the International Conference on the Modern Development of the Rose, held on May 20, 1912. Many foreign rosarians attended and their speeches are full of ideas for the British grower. Practically everything connected with Rose-growing is dealt with by the various speakers and writers, and from one end to the other the annual is worthy of the most careful study. Lovers of all types of Roses will find their particular favourites discussed, and their habits, likes, and dislikes treated upon; failures and successes are freely recorded, and in this way one learns much. There are about four coloured photographs, beautifully executed, and also many other pleasing illustrations. In brief, we can only repeat our advice, viz. to get the book.

"Vegetable Culture for Amateurs." By Trevor Monmouth. 8vo., 80 pp., 3rd edition. (Upcott Gill, London, 1913.) 1*s.* net.

We have rarely read a book containing so much sound practical information in such a clear and concise form as this. The whole edition has been re-written, and brought up to date, not only in the

best varieties of each kind of vegetables and salads to grow, but the information on the cultivation of all is equally up to date. A carefully-compiled calendar of operations for each month is given, showing that it is easy by good cultivation to have a full supply of vegetables and salads all the year round. Practical suggestions on how the soil may be improved, and the importance of rotation in crops is fully dealt with. Again, the manuring question is treated in a thoroughly clear and sound manner, and the eradication of the most injurious insect and other pests is equally ably gone into. There are two things we are specially pleased to note in the book, viz. the advice on the value of continuously keeping the Dutch hoe going, whether there are weeds or not, and the strong remarks on the waste of soil fertility by leaving the stumps of vegetables, such as Broccoli, Cabbage, &c., in the soil after the head has been cut. We commend to all garden owners the advice given by the author on these two subjects.

Although the book is written for the amateur, to whom it will be most serviceable, the professional gardener may read it with profit to himself. The whole is arranged in alphabetical order, the printing is good, and the illustrations are very typical of what they represent. Altogether it is an excellent shilling's-worth.

"Beautiful Garden Flowers for Town and Country." By John Weathers. 8vo., 152 pp. (Simpkin, Marshall, Hamilton, Kent & Co., London, 1913.) 1s. 6d. net.

A useful and well-written book, boldly printed, nicely illustrated, and with the botanical as well as the common names of all the flowers mentioned. This is always an advantage, for many who cannot remember the often difficult botanical name are quite familiar with the common one. The author covers a wide field, treating of the soil, situation, cultivation, diseases, annuals, biennials, perennials, colour effects, propagation, and giving excellent descriptions of the best hardy flowers in alphabetical order.

"Beautiful Bulbous Plants for the Open Air." By John Weathers. 8vo., 150 pp. (Simpkin, Marshall, Hamilton, Kent & Co., London, 1913.) 1s. 6d. net.

This is one of the same series as "Beautiful Garden Flowers," and all that is stated about the arrangement of that book applies to this. The author has evidently carefully studied the subject of bulb cultivation, and he gives much practical information on their management, time and depth to plant, and much other equally interesting and useful knowledge.

"The Sweet Pea Annual for 1913." Ed. by Charles H. Curtis and Horace J. Wright. 8vo., 136 pp. (C. H. Curtis, Brentford, 1913.) 2s. net.

This is the best of the series published during the past nine years, and will be of considerable interest to all growers of Sweet Peas, as

it contains the Report of the Fourth Sweet Pea Conference, and other matter specially appealing to growers of this popular flower. There is a table of contents, but no index.

“Twentieth-Century Gardening.” By John Weathers. 8vo., 311 pp. (Simpkin, Marshall, Hamilton, Kent & Co., London, 1913.) 1s. net.

It is really extraordinary how such a large book, so well written and printed, can be published for such a small sum. This volume will be of assistance to the amateur gardener, as its contents range from the making of a garden, the treatment of soils, lawns, glass structures, herbaceous and other plants: in fact, pretty well everything found in a moderate-sized garden. Perhaps too much is made of one particular manure.

“Gardening.” By L. Williams. 16mo., 304 pp. (Nelson & Sons, London, 1913.) 1s. net.

This is another marvellous little book for the money, of handy size, as it may be easily put in one's pocket, and full of sound information.

“Garden-Work for Every Day.” By H. H. Thomas. 8vo., 156 pp. (Cassell, London, 1913.) 1s. net; cloth, 1s. 6d. net.

The title exactly describes this excellent little book, as it tells the operations in the garden for every day through the whole year in a very clear and concise manner.

“Fruits and Vegetables under Glass.” By William Turner. 4to., 255 pp. (Routledge, London, 1912.) 21s. net.

Written by a well-known authority in the United States for readers there, we can strongly recommend this book to British gardeners as a thoroughly good book to have and to study. The advice given all through may be followed in almost every case. Conditions are different in America from what they are in this country, and the author recommends more ventilation in the summer months than would be safe or advisable in this country with our changeable climate; but, making allowance for the different conditions of climate, all practical men will agree that the author has written a really sound and interesting book, full of instructive matter from end to end. Every phase of fruit and vegetable culture under glass is ably dealt with, including Vines, Peaches, Nectarines, Figs, Melons, Strawberries, &c., the making of borders, composts for pot fruit trees, manures, diseases, and, under the heading of “Vegetables under Glass,” the forcing of Lettuce, Cauliflower, Tomatos, Cucumbers, Asparagus, Beans, Seakale, Rhubarb, &c., &c., are all fully written about. A word of praise is also due to the excellent illustrations, being very typical of what they represent, and assist the reader considerably in understanding the author's instructions. The book is admirably got up, and would be a very acceptable gift to a gardener, as well as a handsome addition to the library. There is a first-rate index to the work.

"The Land of the Blue Poppy : Travels of a Naturalist in Eastern Tibet." By F. Kingdon Ward. 8vo., xii + 283 pp. (University Press, Cambridge, 1913.) 12s. net.

There is a fascination and a mystery about Tibet that makes one eager to read of the journeys made by those whose good fortune it is to penetrate into that country of almost unknown peoples. Few Europeans have entered it yet, and though the veil of mystery is rent in places it is still complete enough to obscure the vision, and the fascination remains. Furthermore, the climate is such that we may be certain that the majority of the plants the country holds will prove hardy in England, and it was for these the author went, and he secured seeds of not a few for Messrs. Bees. Some of his new plants have already been figured in our JOURNAL, and several have been seen at our Exhibitions.

The author is, however, not only a botanist, but a geographer of no mean attainments. He is, perhaps, not even first a botanist, and though the descriptions of the vegetation he met with are good, yet the descriptions of the curious conformation of the country he traversed, and of the conditions that so greatly determine the nature of the vegetation, are better still. He found the people friendly, though he travelled in troubled times and along forbidden paths, and most of the trials he had to endure, apart from the discomforts inseparable from travel in an untravelled land, arose from the weather and the deeply-cut gorges which cleave the high plateau which constitutes East Tibet. The journey lay about the upper reaches of the three great rivers Mekong, Salween, and Yang-tze, and its story is told clearly and well, while the illustrations and whole "get up" of the book are admirable.

"Principles and Practice of School Gardening." By Alexander Logan. 8vo., 313 pp., with coloured frontispiece and 102 other illustrations. (Macmillan, London, 1913.) 3s. 6d.

There are now a number of books dealing with school gardening, and on the whole the one now before us is the best we have seen. From cover to cover it is full of suggestions which cannot but be of the greatest help to the school-garden teacher in arranging his lessons.

As a source of purely horticultural information it will here and there be found wanting, the fruit section being particularly weak. Furthermore, the recommendations are not always in accordance with the best horticultural practice. For example, on page 165, the spring is given as the best time for planting a new strawberry bed, and on page 245 the root pruning of standard trees is talked of. Red Currants are said to fruit similarly to Gooseberries and to require to be pruned in the same way, whereas Red Currants bear entirely upon the spurs and need to be pruned in the same way as Pears, and not in the same way as Gooseberries.

The apple tree represented in figure 84 (reproduced from a Leaflet

of the Board of Agriculture) would seem to us to be a five-year-old *bush* tree. Yet the only reference to it which we can find in the text mentions it as a *standard*.

It is recommended that herbaceous plants should be divided by means of a spade.

The author suggests several fairly complicated manurial experiments. We question the wisdom of this, for in our opinion the problem of manuring is too complex for the school-garden pupil; and even if it were not, the fact remains, as the author himself says, that the available ground in the average school garden "is so small that results can hardly be accepted as conclusive."

In the chapter on plant diseases directions are given as to the way in which potatoes showing "irregularly-shaped small wart-like growths of a blackish colour" should be treated before planting. If the scheduled disease caused by *Chrysophlyctis endobiotica* is referred to, as we presume is the case, it surely should have been recommended that tubers which are even suspected of being infected should not be planted. It is not lawful to plant tubers which are *known* to be attacked by this fungus.

Care has obviously been taken to avoid the inaccuracies which unfortunately so often accompany simple language. On page 219, however, it would have been better to have used the word *water*, in place of *sap*, in the passage "for through them" (*i.e.* the leaves) "would pass away as vapour precious *sap*."

The printing and illustrations are both good, and we have no hesitation in recommending this book to all who are interested in school gardens, for it is written upon the right lines.

"School and Home Gardens." By W. H. Meier. 8vo., iv + 319 pp.; 157 figs. (Ginn, London, 1913.) 4s.

In his preface the author says: "This book gives definite instruction for arranging, planting, and caring for plants commonly grown in house, yard, or garden." Taking this as his aim, we can safely say that the author has ably achieved what he set out to do. The book contains numerous good illustrations and several interesting planting schemes.

"Agronomy: A Course in Practical Gardening for High Schools." By W. N. Clute. 8vo., xi + 296 pp.; 194 illustrations. (Ginn, London, 1913.) 4s. 6d.

This is a book which deserves a place in every school library, and will prove of greatest value to the nature-study teacher. We have nothing but praise for it from the teacher's point of view. The practical exercises at the end of each chapter, together with the references to fuller works, are extremely valuable. Chapter 5, on the organization of the plant, is a remarkably good one. The whole of the book is carefully written and is quite worth the money asked for it.

"The Living Plant: A Description and Interpretation of its Functions and Structure." By W. F. Ganong. 8vo., xii + 478 pp. (Holt, New York, 1913.) \$3.50 net.

When we saw the name of the author on the title-page of this book, expectations of something out of the ordinary run of botanical text-books were raised, and when we had read the book we laid it down with the feeling that those expectations had in no way been disappointed. The only fault we have to find with the book is concerning the weight of the paper used! The author is a true teacher as well as an accomplished botanist, and his text-book is a presentation of the facts of plant-life at once fresh, accurate, and interesting, and not least among its excellencies is the language, lucid and remarkably free from technicalities.

It is unnecessary to give an epitome of its contents in this brief review, for that the title gives, and all the various life-processes are adequately dealt with and their relations with one another clearly pointed out.

It is a book we can heartily recommend.

"Les Ennemis des Plantes Cultivées." By Georges Truffaut. 8vo., 565 pp. (Truffaut, Versailles, 1912.) Paper covers, 10 fr.

Visitors to the International Horticultural Exhibition at Chelsea will remember the splendid collection of injurious insects, &c., shown by the author, and will be prepared to find in this work, which is based upon and illustrated from that collection, not only a ready guide to the determination of insect and fungus pests, but also a guide as to suitable treatment. The book aims to be a "*Traité Complet de Pathologie et de Thérapeutique Végétales*," and comes as near to that ideal as is possible within the space given to it.

"Wild Flower Preservation: A Collector's Guide." By May Coley. 8vo., 191 pp. (Unwin, London, 1913.) 3s. 6d. net.

Notes on collecting, drying, and mounting plants, with a glossary of botanic terms. The print and illustrations, some of which are coloured, are mostly good, but the notes are silent on the preservation of some of those structures that most do torment the collector.

"Plant Life." By Professor J. B. Farmer, F.R.S. 8vo., 255 pp. (Williams & Norgate, London, 1913.) 1s. net.

This little book forms No. 72 of the Home University Library. The subject of which it treats is so vast that any attempt to cover it in a single small book, if not actually foredoomed to failure, is at least liable to result in compression so great as to make it difficult for the non-technical reader, for whom we suppose these little books are intended, to gain a clear view of the unity of its theme. That the information contained is accurate it is needless to emphasize, but we hope the editors will see their way to the production of other

books in the series dealing with special parts of the world of plants. Those familiar with plant-life will find many suggestive hints worth following up.

“Submerged Forests.” By Clement Reid. 8vo., 129 pp. (University Press, Cambridge, 1913.) 1s. net.

Not a little interest attaches to the submerged forests which are so numerous round our coasts, and which occur as well, strangely enough, in the middle of the North Sea, on the well-known Dogger Bank. The reviewer well remembers the interest he felt in examining the moss remains in the “moor log” from this ancient forest, and finding plants not only British but also others confined now to Continental Europe. The author gives an account of these strange relics in a very interesting way, and as only one could who has devoted an immense amount of patient investigation to the remains found in them. Like all the “Cambridge Manuals,” this is a reliable and well-written guide to a special branch of knowledge.

“Toadstools and Mushrooms of the Country Side.” By Edward Step, F.L.S. 8vo., xvi + 143 pp. (Hutchinson, London, 1913.) 5s. net.

One hundred and thirty-five photographic plates, some of them coloured, form the bulk of this book, which is intended for the pocket. Notes descriptive of the fungi illustrated and their near allies, with an account of their habitats and properties, form the letterpress. The book will prove an interesting companion on a ramble in the autumn or winter woods. Only the larger forms of capped fungi are dealt with, and the author promises a further instalment dealing with the puff-balls, earth-stars and so on, if the present one meets the success it certainly deserves. One little criticism we may be allowed to offer. Is it really incumbent on the author to coin “common” names? Is *Amanita spissa* commonly known as “Heavy Toadstool,” or *Lepiota excoriata* as “Flayed Parasol,” or *Clitocybe phyllophila* as “The Leaf-Lover,” or *Russula furcata* as “Fork-gilled Russule”?

“Clay’s Successful Gardening.” Ed. 5. 8vo., 331 pp. (Clay, Stratford, 1913.) 1s. net.

A great variety of gardening matters is dealt with by well-known writers, and much valuable information is given on the growing and showing of all kinds of plants.

“An Introduction to the Chemistry of Plant Products.” By P. Haas and T. G. Hill. 8vo., xii + 401 pp. (Longmans, Green, London, 1913.) 7s. 6d. net.

We are thankful to the authors for bringing together within the covers of one volume the material here collected. All serious students of physiological botany will find it a valuable aid, especially as references are given to the chief literature and bibliographies under each of the groups of substances treated of.

“An Introduction to Plant Geography.” By M. E. Hardy, D.Sc. 8vo., 192 pp., 66 figures. (Clarendon Press, Oxford, 1913.) 2s. 6d.

Although written for upper forms in courses of geography, this book will be useful for those who wish to attain some acquaintance with the more extensive types of vegetation in the world. The author has travelled extensively in many lands, and he gives his own impressions, illustrated by numerous pen-sketches, photographs, and diagrams. The reader is introduced to the main features of such types as equatorial and monsoon rain-forests, various forms of tropical and temperate scrubs, prairies, and deserts, progressing from the rich vegetation of the tropics to the sturdy thrifty plants of the arctic zone. No attempt is made to tackle details, and yet the author presents a wonderfully realistic picture of the conditions under which each type is developed. Sometimes, in avoiding difficult questions, there is a tendency to use phrases not quite strictly botanical, but this is a common fault and not easy to avoid in a comprehensive elementary book. The illustrations are well chosen and full of interest. The influence of vegetation on the races of man is indicated, the slight progress made by man against the rank tropical vegetation, the great promise held out for successful colonization of the sub-tropical, the great development of civilization in regions like the Mediterranean where vegetation is varied, and the poverty of the Arctic zones; these are some of the topics on which one would have liked to hear more.

NOTES ON RECENT RESEARCH
AND
SHORT ABSTRACTS FROM CURRENT PERIODICAL
LITERATURE, BRITISH AND FOREIGN,
AFFECTING
HORTICULTURE & HORTICULTURAL SCIENCE.

THE endeavour commenced in volume xxvi. to enlarge the usefulness of the Society's Journal, by giving an abstract of current Horticultural periodical literature, has met with much appreciation. It has certainly entailed vastly more labour than was anticipated, and should therefore make the Fellows' thanks to those who have helped in the work all the more hearty.

There are still, we feel, some departments of Horticulture and Horticultural Science very imperfectly represented in these abstracts, and the Editor would be grateful if any who have time at command, and who are willing to help in any special direction in this work, would communicate with him. He desires to express his most grateful thanks to all who co-operate in the work, and he ventures to express the hope that they will all strictly adhere to the general order and scheme of working, as the observance of an identical *order* renders subsequent reference to the original easy. The order agreed on is as follows:—

1. To place first the name of the plant, disease, pest, &c., being noticed; and in this, the prominent governing or index word should always have precedence.

2. To place next the name, when given, of the author of the original article.

3. Then, the abbreviated form of the name of the journal, &c., in which the original article appears, taking care to use the abbreviation which will be found on pp. 453, 454.

4. After this, a reference to the number, date, and page of the journal in question.

5. If an illustration be given, to note the fact next, as "fig.," "tab.," or "plate."

6. After these preliminary necessities for making reference to the original possible for the reader, the abstract or digest should follow, ending up with the initials of the contributor affixed at the close of each Abstract or Note.

NAMES OF THOSE WHO HAVE KINDLY CONSENTED TO HELP
IN THIS WORK.

Baker, F. J., A.R.C.S., F.R.H.S.
 Ballard, E., F.R.H.S.
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 Welby, F. A., F.R.H.S.
 Whittles, W., F.R.H.S.
 Williams, S. E., F.R.H.S.
 Wilson, Gurney, F.L.S., F.R.H.S.

JOURNALS, BULLETINS, AND REPORTS

from which Abstracts are made, with the abbreviations used for their titles.

Journals, &c.	Abbreviated title.
Agricultural Gazette of New South Wales	Agr. Gaz. N.S.W.
Agricult. Journal, Cape of Good Hope	Agr. Jour. Cape G.H.
Annales Agronomiques	Ann. Ag.
Annales de la Soc. d'Hort. et d'Hist. Naturelle de l'Hérault	Ann. Soc. Hé.
Annales de la Soc. Nantaise des Amis de l'Hort.	Ann. Soc. Nant. des Amis Hort.
Annales des Sciences Naturelles	Ann. Sc. Nat.
Annales du Jard. Bot. de Buitenzorg	Ann. Jard. Bot. Buit.
Annals of Botany	Ann. Bot.
Beiheft zum Botanischen Centralblatt	Beih. Bot. Cent.
Boletim da Real Sociedade Nacional de Horticultura	Bol. R. Soc. Nac. Hort.
Boletim da Sociedade Broteriana	Bol. Soc. Brot.
Bollettino della R. Società Toscana d'Orticultura	Boll. R. Soc. Tosc. Ort.
Botanical Gazette	Bot. Gaz.
Botanical Magazine	Bot. Mag.
Bulletin de la Société Botanique de France	Bull. Soc. Bot. Fr.
Bulletin de la Soc. Hort. de Loiret	Bull. Soc. Hort. Loiret.
Bulletin de la Soc. Mycologique de France	Bull. Soc. Myc. Fr.
Bulletin Department of Agricult. Brisbane	Bull. Dep. Agr. Bris.
Bulletin Department of Agricult. Melbourne	Bull. Dep. Agr. Melb.
Bulletin of the Botanical Department, Jamaica	Bull. Bot. Dep. Jam.
Bulletin of Bot. Dep. Trinidad	Butt. Bot. Dep. Trin.
Canadian Reports, Guelph and Ontario Stations	Can. Rep. G. & O. Stat.
Centralblatt für Bacteriologie	Cent. f. Bact.
Chronique Orchidéenne	Chron. Orch.
Comptes Rendus	Comp. Rend.
Contributions from U.S.A. Herbarium	Contr. fr. U.S.A. Herb.
Department of Agriculture, Victoria	Dep. Agr. Vict.
Department of Agriculture Reports, New Zealand	Dep. Agr. N.Z.
Dictionnaire Iconographique des Orchidées	Dict. Icon. Orch.
Die Gartenwelt	Die Gart.
Engler's Botanische Jahrbücher	Eng. Bot. Jah.
Gardeners' Chronicle	Gard. Chron.
Gardeners' Magazine	Gard. Mag.
Gartenflora	Gartenflora.
Journal de la Société Nationale d'Horticulture de France	Jour. Soc. Nat. Hort. Fr.
Journal Dep. Agricult. Victoria	Jour. Dep. Agr. Vict.
Journal Imperial Department Agriculture, West Indies	Jour. Imp. Dep. Agr. W.I.
Journal of Agricultural Science	Jour. Agr. Sci.
Journal of Botany	Jour. Bot.
Journal of Chemical Society	Jour. Chem. Soc.
Journal of Economic Biology	Jour. Econ. Biol.
Journal of Economic Entomology	Jour. Econ. Entom.
Journal of Genetics	Jour. Gen.
Journal of Horticulture	Jour. Hort.
Journal of the Board of Agriculture	Jour. Bd. Agr.
Journal of the Linnean Society	Jour. Linn. Soc.
Journal of the Royal Agricultural Society	Jour. R.A.S.
Journal of the Society of Chemical Industry	Jour. Soc. Chem. Ind.
Journal S.E. Agricultural College, Wye	Jour. S.E. Agr. Coll.
Kaiserliche Gesundheitsamte	Kais. Ges.
La Pomologie Française	Pom. Franç.
Le Jardin	Le Jard.

Lebensgeschichte der Blütenpflanzen Mitteleuropas	Lebens. d. Blütenpfl.
Mycologia	Mycologia.
Naturwiss. Zeitschrift Land und Forst	Nat. Zeit. Land-Forst.
Notizblatt des Königl. Bot. Gart. und Museums zu Berlin	Not. König. Bot. Berlin.
Oesterreichische Garten-Zeitung	Oester. Gart. Zeit.
Orchid Review	Orch. Rev.
Orchis	Orchis.
Phytopathology	Phytopathology.
Proceedings of the American Pomological Society	Am. Pom. Soc.
Quarterly Journal of Forestry	Quart. Jour. of Forestry.
Queensland Agricultural Journal	Qu. Agr. Journ.
Reports of the Missouri Botanical Garden	Rep. Miss. Bot. Gard.
Revue de l'Horticulture Belge	Rev. Hort. Belge.
Revue générale de Botanique	Rev. gén. Bot.
Revue Horticole	Rev. Hort.
The Garden	Garden.
Transactions Bot. Soc. Edinburgh	Trans. Bot. Soc. Edin.
Transactions of the British Mycological Soc.	Trans. Brit. Myc. Soc.
Transactions of the Massachusetts Hort. Soc.	Trans. Mass. Hort. Soc.
Transactions Royal Scot. Arboricultural Soc.. . . .	Trans. Roy. Scot. Arbor. Soc.
U.S.A. Department of Agriculture, Bulletins	U.S.A. Dep. Agr.*
U.S.A. Experimental Station Reports	U.S.A. Exp. Stn.†
U.S.A. Horticultural Societies' publications	U.S.A. Hort. Soc.†
U.S.A. State Boards of Agriculture and Horticulture	U.S.A. St. Bd.†
Woburn Experiment Farm Report	Woburn.

* The divisions in which the U.S.A. Government publish Bulletins will be added when necessary.

† The name of the Station or State will in each case be added in full or in its abbreviated form.

NOTES AND ABSTRACTS.

Abelia floribunda. By D. Bois (*Rev. Hort.* Dec. 1, 1912 ; p. 544 ; coloured plate).—A very beautiful shrub, bearing numerous clusters of five or six long, pendent, trumpet-shaped, warm rose-coloured flowers. Native of Mexico, and therefore not hardy, but well adapted for a warm conservatory.—C. T. D.

Aechmea spectabilis. By F. Borsos (*Oestr. Gart. Zeit.* vol. viii. pt. iii. pp. 80–82 ; 2 figs.).—The sword-shaped leaves of *Aechmea spectabilis* attain a length of $3\frac{1}{2}$ feet and end in thorns. The flower stem is 4 feet in length ; the panicles are five or six weeks in developing. The carmine-coloured flowers open one by one, and the flowering period lasts two or three months.

This *Aechmea* is propagated from side shoots. It is grown in a mixture of coarse peat, charcoal, coarse sand, loam, sphagnum, and a little coal-dust. Good drainage is necessary and a warm, moist atmosphere (95° F.).—S. E. W.

Agave disceptata (*Bot. Mag.* tab. 8451).—Central America ? Family *Amaryllidaceae*, tribe *Agaveae*. Succulent under-shrub. Leaves fibrous. Scape $5\frac{1}{2}$ feet high. Flowers on a loose spike. Perianth-lobes greenish, with rosy-purple edges, $\frac{1}{2}$ inch long.—G. H.

Agave Haynaldii (*Bot. Mag.* tab. 8481).—Mexico or Central America. Family *Amaryllidaceae*, tribe *Agaveae*. Shrub, rosette with 80 leaves. Leaves $3\frac{1}{2}$ feet long. Inflorescence 23 feet high. Perianth pale yellowish-green, 1 inch long.—G. H.

Agave Warelliana (*Bot. Mag.* tab. 8501).—Mexico. Family *Amaryllidaceae*, tribe *Agaveae*. Shrub. Rosette, acaulescent, of seventy-five leaves, 3 feet high. Leaves 29 inches long. Inflorescence 15 feet high. Spike dense, 9 feet high, 14 inches broad. Perianth yellowish-green, mottled with brown or red.—G. H.

Akania Hillii (*Bot. Mag.* tab. 8469).—Australia. Family *Sapindaceae*, tribe *Sapindeae*. Tree, 30–40 feet high. Leaves unequally pinnate, 1–2 feet. Leaflets 6–15 on each side, 5–12 inches long, coriaceous, margins spinulose-serrate. Flowers, petals 5, pale rose, subreflexed.—G. H.

Alaska (*U.S.A. Exp. Stn., Alaska, Ann. Rep.*, 1910 ; 85 pages ; 13 plates).—This report describes the climatic conditions of the different stations, the agricultural practices suitable to the peculiar conditions, and the work which has been done in raising varieties of corn, fruits, &c., best adapted to this northern country. The range of temperature

at one of them in 1910 is given as -63°F. to $+91^{\circ}\text{F.}$, and at another -70°F. to $+85^{\circ}\text{F.}$ (pp. 77-85). Strawberries are being hybridized with the wild *Fragaria chiloensis* of the coastal regions and a number of promising sorts have been obtained, though they are slow in developing (pp. 11-14). After several years of observation it is thought that no apples of any of the varieties now known and cultivated can be successfully grown in any part of the country (p. 20). The cultivation of the cherry and plum, too, is not hopeful in the open, but the currant, gooseberry, and raspberry thrive and fruit as well as anywhere on earth (p. 23). The wild raspberry has been found in abundance within a degree of the Arctic circle. Of the cereals, barley is the most promising up to the present, and the raising of new varieties is in progress, the ideal being a variety which, in addition to other good qualities, will mature fully in 90 days between seed-time and harvest. In 1910 there were only 84 days between killing frosts in spring and fall (p. 30). Barley is considered to have a wider field of usefulness than oats in these latitudes, though several varieties of these are being tested with good results, especially North Finnish Black.

Alaskan soils yield but a limited supply of available plant food, and soon become exhausted. Animal manure of any sort is scarce, and the cost of artificial manures in the interior is almost prohibitive (p. 38). The solution suggested is summer fallowing alternate years and green manuring, combined with the application of such manures as can be obtained.—*A. P.*

Albuminoids and Invertase. By Sergius L. Ivanow (*Beih. Bot. Cent.* Bd. 29, Abt. 1, Heft 1, pp. 144-158).—The author tested plants, both when in the resting winter state and in flower, for the presence of peptolytic ferments and invertase.

The seeds of *Brassica Napus oleifera* gave a negative result. No reaction for peptolytic ferments was found in any of the plants tested when in the resting state (seeds, buds, leaves, rhizomes, or whole plants such as *Lemna*, *Sedum album*, 'Cactus,' *Polytrichum*, and Lichens). Invertase was not found in Lilac and Mistletoe buds, in leaves of *Pinus* and *Agave*, and in rhizomes of *Convallaria* and *Iris germanica* but occurred in Coltsfoot rhizomes, *Lemna*, and *Sedum album*.

When germinated plants were used peptolytic ferments were found in Flax seedlings,* Cucumber,* Sunflower,* *Lathyrus**, and *Phaseolus* seedlings, also in flowering plants of Hyacinth, *Crocus*, *Scilla*, Tulip,* *Gagea**, *Agave**, and *Phyllocactus**, but not in *Viola**, *Asarum**, *Anemone**, Hellebore*, Shepherd's Purse*, *Chelidonium*, *Lemna**, and *Pulmonaria**; nor in the developed buds of *Lonicera**, and *Sambucus**, nor in roots and rhizomes (*Paris*, *Polygonatum*, *Arum*, *Phyteuma**), nor in the aerial parts of *Paris*, *Polygonatum**, *Arum*, and Rye.*

But these ferments occurred in *Agaricus*, ripening seeds and fruits of *Carica papaya*, though not in those of *Philodendron*, *Cucumis**, and *Citrus**. *Lunularia* gave no reaction.

Those marked * also showed invertase.—*G. F. S. E.*

Alkali Land, The Choice of Crops for. By Thomas H. Kearney (*U.S.A. Dep. Agr., Farm. Bull.* 446; May 1911).—One of the most serious obstacles to agriculture in the arid portions of the United States is the frequent presence in the soil of an excess of readily soluble alkali salts, and it is estimated that one-tenth of the irrigated land in the west contains an injurious quantity. Very few useful plants can be depended upon to grow where more than 1·5 per cent. of the dry weight of the soil consists of alkali salts, among these being members of the goosefoot family (*Chenopodiaceae*), salt-grass (*Distichlis spicata*), and sugar beets, the latter being able to grow in the presence of as much as 2·5 per cent., though the roots thus produced are small, the sugar content low, and the ash content of the juice high (p. 13). The date palm is the only fruit tree which can be expected to yield fruit of good quality when there is as much as 1·5 per cent. of alkali in the soil. Where the content is less than 1 per cent. most of the ordinary farm crops can be grown with varying degrees of success if the surface soil is relatively free at the time of seeding, as, for instance, soon after heavy rains (p. 11). These percentages apply only to what are known as white alkali salts (such as sodium sulphate, chloride, and bicarbonate), as little as ·05 per cent. of black alkali (sodium carbonate) being too much for good crop production with most species (p. 8). For land that is being reclaimed by flooding the sorghums are considered the most satisfactory crop to grow during the process (pp. 16, 20).

A. P.

Aloe africana, Mill. By H. Strauss (*Gartenflora*, vol. lxii. pt. vii. pp. 137–138; 1 coloured plate).—*Aloe africana* closely resembles *A. pluridens*, but differs from it by having yellow flowers with green stripes. It is a native of south-east Cape Colony, and is found on the coast.—S. E. W.

Aloe Marlothii (*Bot. Mag.* tab. 8484).—South Africa. Family, *Liliaceae*, tribe *Aloineae*. Shrub, succulent. Leaves 1 $\frac{3}{4}$ foot long. Peduncle 3 feet high. Flowers secund, 1 $\frac{1}{2}$ inch long, yellow outside, striped with green.—G. H.

Aloe Steudneri (*Bot. Mag.* tab. 8448).—Eritrea and Abyssinia. Family *Liliaceae*, tribe *Aloineae*. Herb, succulent. Leaves in a rosette a yard across, 2 feet long. Inflorescences, two from same crown, 6–10 inches long. Perianth pieces 2 inches long; three outer, deep red; three inner, rose-pink below, dark yellow at the tip.—G. H.

Alpines. By A. C. Baumgartner (*Oestr. Gart. Zeit.* vol. vii. pt. xii. pp. 441–455).—Part I., A Monograph of the Saxifrages.—S. E. W.

Amelanchier oligocarpa (*Bot. Mag.* tab. 8499).—North America. Family *Rosaceae*, tribe *Pomeae*. Shrub, usually dwarf, rarely 5 feet high. Leaves oblong, 1 $\frac{1}{2}$ –2 inches long. Flowers, 1–3 to a shoot. Petals white.—G. H.

Amelanchier spicata, Abnormal Flowers of. By J. J. Clark (*Ann. Bot.* vol. xxvi., July 1912, pp. 948, 949).—A case is recorded of the petals of *Amelanchier spicata* becoming staminoid. Double flowers resulting from the petalody of the stamens is frequent enough in Rosaceae, but the reverse is unusual. The petals in the specimens described show more or less infolding of their lateral margins, and in extreme cases developed at their tips anthers in which pollen-grains were found. The flowers were abnormal in some other respects.

A. D. C.

American Blight (*Schizoneura lanigera*). By W. W. Froggatt (*Agr. Gaz. N.S.W.*, vol. xxiii. pp. 520–528).—American blight or woolly aphid attacks the roots and the branches of apple trees. Treatment of the diseased trees with carbon bisulphide is not advised, as the trees are not protected from future attacks and may be injured. A better plan is to lay bare the roots in a circle of two feet from the trunk, scrape the galls on the roots, spread three pounds of waste tobacco over the exposed roots, fill in with earth and pour a bucket of water on the trunk, or instead of tobacco drench the roots with kerosene emulsion. To clean the branches, fumigate with hydrocyanic acid at intervals of six weeks, or spray with red oil or kerosene emulsions. On the small scale paint with castor oil or raw linseed oil.

S. E. W.

Amorphophallus corrugatus (*Bot. Mag.* tab. 8475).—Siam. Family *Aroideae*, tribe *Pythonieae*. Herb, tuberous. Leaf solitary; petiole 1½–2 feet long, dirty-green with tawny blotches; blade 3-partite. Peduncle 10–22 inches long. Spathe erect, 3–6 inches long, hooded, green and mottled with white, margins purple. Spadix, female portion tawny-purple, male portion rose; appendix corrugated, ochre-yellow.—G. H.

Anemones and Ranunculus (*Rev. Hort.* Sept. 16, 1912; p. 414).—It has been found that the dormant roots of these, if kept under such dry conditions as to prevent growth at the normal season, may, after the period of rest is long over, be planted and will grow and flower at practically any desired season, while the flowers are finer and more double than when planting is done under the ordinary conditions. The Dutch make a speciality of these retarded roots.—C. T. D.

Apple Blister Canker and Methods of Treatment. By W. O. Gloyer (*U.S.A. Exp. Stn., Ohio, Cir.* 125).—Apple Blister Canker is due to the attacks of *Nummularia discreta*. It is a serious disease of apple trees in the United States, and has also been reported on *Magnolia* and *Sorbus*.

It was first described in America by Schweinitz in 1834 and was known in France in 1863.

Large cankers appear on the limbs and trunks of apple trees, the heart-wood becomes discoloured, the epidermis peels off, exposing the tan-coloured stromata of the fungus.

Two kinds of spores are known, conidia given off from more or less branched conidiophores, which grow out from the stromata the first year, and asci containing black ascospores which are formed in the stromata the following April-June.

The fungus is a wound parasite.

The preventives suggested in this circular are:—

- (i.) Burn all diseased wood.
- (ii.) Prevent cut surfaces from drying out by applying asphaltum or some other substance which will form a layer over the surface.
- (iii.) Spray trunks and large branches as well as leaves and branches when spraying for scab.
- (iv.) Grub up badly diseased trees. It is not sufficient to cut them down, as the fungus can spread to the roots, but cannot form stromata below the surface of the soil.—*D. M. C.*

Apple Leaf Spot (*Jour. Bd. Agr.* vol. xx., No. 6, pp. 513-515; plate).—The disease caused by *Sphaeropsis malorum*, Peck, which attacks the leaves, fruits, and branches of apples, pears, and quinces, is described, and preventive measures are suggested.—*A. S.*

Apple, Powdery Mildew of (*Podosphaera leucotricha*). By C. F. Cole (*Jour. Agr. Vict.*, Sept. 1912).—If discovered in its early stage, spray at once with Bordeaux mixture or lime-sulphur wash. If in an advanced stage, cut away diseased parts and burn, following by spraying with either of the already-named fungicides. Flowers of sulphur or freshly slaked lime will destroy this pest if dusted on as soon as detected in its early stages of development.—*C. H. H.*

Apple Trees, Spraying of. By J. Hughes (*Agr. Gaz. N.S.W.* vol. xxiii. pp. 719-722).—When spraying for woolly aphis with red oil, mix with hot water and use warm. Apply immediately the leaf has fallen, and again just before the tree breaks into bud. For codling moth spray with lead arseniate when 90 per cent. of the blossom has fallen. Repeat three and seven weeks respectively after the first application.—*S. E. W.*

Asparagus. By R. W. Peacock (*Agr. Gaz. N.S.W.*, vol. xxiii. pp. 707-712; 4 figs.).—Asparagus does best on sandy loam, rich in vegetable matter, in a sunny position. An annual dressing of well-rotted farmyard manure in autumn is necessary. Old-established roots may be cut for ten weeks. When the cutting is finished, apply 250 lb. sodium nitrate, 400 lb. superphosphate, and 150 lb. potassium chloride to the acre. Common salt is little used by commercial growers.—*S. E. W.*

Aster Purdomii (*Bot. Mag.* tab. 8476).—China. Family *Compositae*, tribe *Asteroideae*. Herb, 6 inches high. Leaves radical, ovate-elliptic, $1\frac{1}{4}$ – $1\frac{1}{2}$ inch long. Flower-head $2\frac{1}{2}$ inches across. Ray-florets about 40, pale violet. Disk-florets pale yellow.—*G. H.*

Avocado in Hawaii. By J. E. Higgins, J. Hunn, and V. S. Holt (*Hawaii Exp. Stn., Bull.* 25; Dec. 16, 1911; plates).—Among tropical fruits the taste for which in temperate climates is rapidly increasing is the Avocado (*Persea gratissima*), sometimes, but inaccurately and rather unfortunately, called the Alligator Pear.

This is an account of the growing importance of the cultivation of this fruit in Hawaii, and of all the processes of rearing, propagating, and cultivating the tree and of gathering, grading, and marketing the fruit. A descriptive list of some varieties now being tested in Hawaii and on the mainland is given, and some recipes are added for the preparation of the fruit for the table.—*M. L. H.*

Begonia, A Bisexual "Gymnospermous." By R. A. Dümmer (*Ann. Bot.* vol. xxvi., Oct. 1912, pp. 1123, 1124).—Records the occurrence of a bisexual flower of *Begonia semperflorens* var. *gigantea*. The gynœcium was entirely superior and the ovaries wholly exposed owing to the disappearance of the protecting ovary wall. The stamens originated from the base of the ovuliferous lamellæ, and in some cases were fused with the styles.—*A. D. C.*

Begonia boliviensis sulphurea. By Ferd. Cayeaux (*Rev. Hort.* May 1, 1913; pp. 200–202; 4 illustrations).—An account of the origin, so far as traceable, of this *Begonia* species, which is of somewhat dwarf habit, very floriferous, and with yellow flowers. Possibly of value for hybridization, but, curiously enough, its multitude of flowers appear to be nearly all males, the few exceptions being imperfect, and so far producing no seed. Crosses have, however, been effected; 'Clair de lune,' between it and an unnamed tuberous *Begonia*, and *B. × bolidavis*, *B. Davisii* × *B. boliviensis sulphurea*, very floriferous and of an orange colour, suited for border planting.—*C. T. D.*

Begonia, 'Lena' and others suitable for suspended Baskets. By E. Laumonnier-Ferard (*Rev. Hort.* Feb. 1913; 1 illustration and coloured plate).—'Lena' is an extremely handsome, floriferous, tuberous plant, with large, pendulous, deep crimson double flowers, 3 inches or more in diameter. A descriptive list of others is given.

C. T. D.

Berberis verruculosa (*Bot. Mag.* tab. 8454).—China. Nat. Ord. *Berberidaceae*, tribe *Berberideae*. Shrub, evergreen, 3–4 feet high. Flowers yellow. Berry purplish-blue, pruinose.—*G. H.*

Birds, The Food of Nestling. By W. E. Collinge (*Jour. Bd. Agr.* vol. xix., No. 6, pp. 460–465).—"Practically all birds, excepting doves and pigeons, feed their young upon an animal diet, whatever may be the character of the food of the adult." The present article consists mainly of observations bearing upon the quantity and nature of the food of the young of the starling, house sparrow, song thrush, and blackbird. When it is "remembered that the nestling season is

also that when the destruction of injurious insects is most needed—that is, at the period of greatest agricultural activity and before the parasitic insects can be depended upon to reduce the pests”—it becomes apparent that “the nature of the food, the amount consumed, and the relation this bears, from an economic standpoint, to the harm done by some species when adult, is not solely a question of interesting curiosity on the part of the bird-lover, but one that has a definite bearing on the success or failure of the produce of the land.”—A. S.

Broad Bean, Black Fly of. By F. V. Theobald (*Jour. Bd. Agr.* vol. xix., Nos. 6, 11, pp. 466-476, 914-922).—The Black Fly, “Blight,” or “Collier” of broad beans (*aphis rumicis*, Linn.) appears to originate from winter eggs on docks, to which the aphides seem to pass regularly each autumn.

On the other hand, the aphid which attacks mangolds and other members of the Chenopodiaceae, and which is regarded as belonging to the same species (*A. rumicis*), seem to winter upon spindle trees (*Euonymus europaeus*). In the summer it passes from the spindle trees on to field poppies, and thence on to mangolds, and in the autumn it returns to the spindle trees.—A. S.

Cabbage. By L. C. Corbett (*U.S.A. Dep. Agr., Farm. Bull.* 433; April 1911; 11 figs.).—This deals with the cultivation of the cabbage both as a market-garden, and as a farm crop, the methods to be adopted in the north differing widely from those found successful in the south. The subject of winter storage is also dealt with.—A. P.

Cacti, Ornamental. By Charles Henry Thompson (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 262; Dec. 1912; plates).—Some practical hints on the cultivation of Cacti, compiled by the botanist in charge of the Succulent Collection in the Missouri Botanical Garden, St. Louis, for the benefit of the American amateur. Though Cacti are, with the exception of a few species of *Rhipsalis*, strictly indigenous to the Western Hemisphere, it is only lately that much interest has been taken in their cultivation there. All the available manuals have been written with a view to European conditions, and are not entirely applicable to America. This bulletin describes the propagation of Cacti from seed, vegetative reproduction, grafting, and gives advice on culture and the treatment and prevention of diseases.

The writer enumerates the uses of the Cactus, in many species as a fruit-bearing plant; the ornamental work which may be made of the woody core of a few; its adaptability as a hedge plant in climates where it can live out of doors all the year, and its decorative value.

He concludes with a list of practically all the varieties now cultivated in America under the following heads:—

1. Columnar forms of Cacti (over 6 feet, from 1 to 2 feet, less than 1 foot high).
2. Globose forms (more than 1 foot in diameter, from 3 inches to 1 foot in diameter, less than 3 inches).

3. *Platyopuntias* and *Nopaleas* (tall, medium, and decumbent).
4. *Cylindropuntias* (tall, medium, and prostrate).
5. Foliage-bearing Cacti (climbing and shrubby).
6. Climbing night-blooming forms of *Cereus*.
7. Plants native to moist Tropical Regions (terrestrial and epiphytic).—*M. L. H.*

Calanthe Siebertiana. By R. Schlechter (*Orchis*, vol. vii. pt. iii. pp. 35–37; 1 plate).—The hybrid obtained by fertilizing *C. × Veitchii* with *C. cardioglossa* bears flowers which resemble *C. × Veitchii* in form, colour, and size. The labellum is broader and beautifully marked.—*S. E. W.*

Calanthe sylvatica. By R. Schlechter (*Orchis*, vol. vii. pt. i. pp. 4, 5; 1 coloured plate).—*Calanthe sylvatica*, from Madagascar, resembles *C. natalensis*. It thrives in a compost of loam, sand, and leaf mould in a warm greenhouse.—*S. E. W.*

Calypso bulbosa, Rch. By G. E. F. Schulz (*Orchis*, vol. vi. pt. vi. pp. 95–99; 3 plates).—*Calypso bulbosa*, better known as *C. borealis*, “the Pearl of the Arctic Circle,” is found on either side of the Arctic Circle in Europe, Asia, and America, more particularly in the island of Vancouver—growing in old fir forests, where it is buried in snow in winter, provided with copious supplies of water when the snow melts, and is dust-dry later in the year.

The flower is as beautiful as the Lady’s Slipper; the edge of the slipper is white or pale lilac, the body red-brown, and the remaining petals are lilac. The cultivation of this orchid presents many difficulties.—*S. E. W.*

Capoc-yielding Cotton-wool Trees of the German Colonies in Tropical Africa. By E. Ulbrich (*Not. König. Bot. Berlin*, vol. vi. no. 51, pp. 1–34; April 1913; with 4 text figures).—Capoc, a name originally applied to a particular cotton-wool-bearing tree, is now employed to signify the product of the tree, viz., the wool from the interior of the capsules of *Ceiba* and some species of *Bombax*.

Lower India, and especially Java, has long been the chief locality from which capoc is derived. More recently Togo and German East Africa have also furnished a supply of capoc. The cotton-wool trees are often very tall, sometimes attaining a height of 60 metres; their trunks are usually unbranched in the lower part, the wood is brittle, and the branches usually bear spines. These characters make the gathering of fruit-capsules from the tree difficult, and in the case of the wild-growing trees it is necessary to wait until the capsules fall to the ground. Where the tree is cultivated, it is usually pollarded when it becomes too high, and finally cut right down and cuttings planted afresh.

In planting cuttings branches are selected which are about as thick as a man’s arm, and these are planted 1–1½ metre deep in the ground and the leaves removed. These soon strike and usually grow

into spineless trees. No fungal disease of any practical significance is known to attack these trees, but several insect pests do considerable damage at times, and some species of Loranthaceae cause considerable trouble in Java.

Capoc wool is not suitable for spinning, but it is of much use for packing pillows, mattresses, and especially swimming-belts and other such life-saving apparatus. It possesses great buoyancy, is wetted with difficulty, and is very resistant to the influence of sea-water.—*R. B.*

Carbonic Acid, Feeding Plants with. By H. Fischer (*Gartenflora*, vol. lxi. pt. xiv. pp. 298–307).—Plants grown in an atmosphere enriched with carbonic acid develop rapidly, flower freely, and resist the attacks of pests. The treatment is carried on in a greenhouse or glass case in bright weather; the gas is generated by the action of hydrochloric acid (strong acid mixed with an equal volume of water) on marble or limestone, using half an ounce of marble and $1\frac{1}{4}$ to 2 cubic inches of the diluted acid for each square yard occupied by the plants. The vessel containing the mixture must be raised above the ground, and the house closed for one hour. The operation may be repeated twice daily. The carbonic acid may also be prepared by burning small quantities of spirits of wine.—*S. E. W.*

Carludovica atrovirens. By P. Jancke (*Gartenflora*, vol. lxi. pt. xxiii. p. 526; 1 fig.).—*Carludovica atrovirens* is found in the forests of tropical America. It attains a height of 4 feet, succeeds in the hot-house in a mixture of loam and peat, and likes plenty of water.—*S. E. W.*

Carnations, Henri Vacherot's Strain. By Henri Vacherot (*Rev. Hort.* Oct. 16, 1912; p. 471; 1 illustration and coloured plate).—Both plates illustrate a very fine strain, claimed to be distinguished by long stalks, floriferousness, hardiness, not dainty as to soil, and requiring no disbudding. Shown to advantage at Holland Park after a journey and nine days' persistence. Silver cup at International Exhibition.—*C. T. D.*

Carnations, History of Garden. By E. M. Kronfeld (*Oestr. Gart. Zeit.* vol. vii. pt. vii. pp. 241–251, pt. viii. pp. 285–294, pt. ix. pp. 332–340, pt. x. pp. 362–389, pt. xi. pp. 405–415; 31 figs., 1 col. plate).—The carnation (*Dianthus Caryophyllus*) was a rare flower in Britain and Germany in the middle of the fifteenth century; its native habitat was probably the African coast of the Mediterranean. The author points out frequent allusions to this flower in literature, and numerous representations of it in art.—*S. E. W.*

Catalpa, Wood Rots of. By N. E. Stevens (*Phytopathology*, ii. p. 114; June 1912; plates).—It has been stated that saprophytic fungi never attack the wood of the Catalpa, but the author shows that this statement is erroneous, and that *Polystictus versicolor* is particularly bad, and *Schizophyllum commune*, *Polyporus adustus*, and *Stereum albobadium* also attack the same wood.—*F. J. C.*

Cattleya gigas. By R. Gaveau (*Orchis*, vol. vi. pt. vi. pp. 103-104).—*Cattleya gigas* is a shy bloomer. To induce it to flower give plenty of light and air, and keep the plants rather dry. Early growth must not be encouraged.—S. E. W.

Cattleya nobilior. By O. N. Witt (*Orchis*, vol. vii. pt. iv. pp. 51-55; 1 plate).—*C. nobilior* flowers much more freely than *C. Walkeriana*: the bulbs generally bear two leaves. The flowers have a uniform deep violet colour, and are borne on a long stem. If the Orchid is kept moderately dry at the time when it is about to produce bulbs, it develops a short flower stem on the leaved bulbs, and is identical with *C. dolosa*. The latter is not a distinct variety.

S. E. W.

Cauliflower and Cabbage Cultivation. By A. J. Pinn (*Agr. Gaz. N.S.W.*, pp. 1059-1075; 9 figs.).—The ground in which cabbages and cauliflowers are grown requires frequent supplies of farmyard manure. In addition, 3 cwt. to the acre of the mixture of bone dust (9 cwt.) and potassium sulphate (1 cwt.) is applied when sowing or planting out, and a dressing of ammonium sulphate $\frac{1}{2}$ cwt., potassium sulphate $\frac{1}{2}$ cwt., and $\frac{3}{4}$ cwt. superphosphate is given before the heads begin to form. The black rot of cabbage (*Pseudomonas campestris*) is propagated in the seed. It is advisable to dip the seed in a mixture of formalin (1) and water (320) for 20 minutes prior to sowing.

In districts where club root (*Plasmodiophora brassicae*) is prevalent, lime the ground and do not grow cabbages on the same plot more than once in three years. Cabbage, kale, rape, turnips, or radishes should not be grown in succession.

The caterpillars of the diamond-backed cabbage moth are killed by an application of boiling water from a watering-can, spraying with kerosene emulsion, or sprinkling with a mixture of dry lime (4 pints) and tobacco dust (1 pint).

Spray with tobacco and soap wash or kerosene emulsion, or dust with soot or lime, to destroy cabbage aphids. Caterpillars are got rid of by feeding with a mixture of bran, treacle, and Paris green.

S. E. W.

Ceropegia Thorneroftii (*Bot. Mag.* tab. 8458).—Transvaal. Family *Asclepiadaceae*, tribe *Ceropegieae*. Herb, twining, perennial. Leaves 1-2 $\frac{1}{2}$ inches long. Corolla white, with purple blotches.—G. H.

Chamaedorea. By P. Jancke (*Gartenflora*, vol. lxi. pt. xv. pp. 326-327; 1 fig.).—A hybrid, *Chamaedorea concolor* \times *Ch. Ernesti Augusti*, resembles *Ernesti Augusti* in growth and durability, and *concolor* in the arrangement of its leaves.—S. E. W.

Chamaedorea. By H. Koehler (*Gartenflora*, vol. lxii. pt. ix. pp. 197-200; 6 plates).—The varieties of *Chamaedorea* are very

useful for house decoration. They are raised from seeds which are ten to twelve weeks in germinating, in a temperature of 53° to 60° F. *C. elegans* is perhaps the best worthy of cultivation. Several hybrids have been obtained, e.g. *C. corallina* × *elator*, *elegans* × *concolor*. The hybrids resemble the male parent.—S. E. IV.

Chamaedorea glaucifolia (*Bot. Mag.* tab. 8457).—Colombia? Family *Palmae*, tribe *Areceae*. Shrub, stem slender, 15 feet. Leaves, ascending, leaflets forty, linear-lanceolate. Panicles, male, 16 inches. Corolla 2½ inches long. Fruit globose, ¼ inch diameter, black, polished.—G. H.

Chestnut, The Bark Disease (*U.S.A. Exp. Stn., W. Virg., Bull.* 137). This bulletin is chiefly a summary of all available publications on the subject of the dangerous bark disease of chestnuts due to *Diaporthe parasitica*, which is causing such damage in the United States.—D. M. C.

Chironia laxa (*Bot. Mag.* tab. 8455).—South Africa. Family *Gentianaceae*, tribe *Chironieae*. Herb, glabrous. Stems laxly branched: Leaves ¾–1 inch long. Flowers showy, usually 2–3, or solitary, terminal. Corolla pale magenta, 2–2½ lines across.—G. H.

Cicadas. By W. W. Froggatt (*Agr. Gaz. N.S.W.* vol. xxiv., pp. 341–344; 3 figs.).—In the neighbourhood of Sydney much damage has been done to the bark of Peach and other trees by cicadas (*Melampusalta incepta*).—S. E. W.

Cissus Species, Growth of the Aerial Roots of a. By Dr. A. H. Blaauw (*Ann. Jard. Bot. Buit.* ser. ii. vol. xi. pt. ii. pp. 266–293, 1912; two text figs.).—*Cissus pubiflora* var. *papillosa* grows high up on the trees in the primeval forests round Tjibodas. Its aerial roots, sometimes 20–30 metres in length, reach down to the ground, and after a time emit lateral branches which root into the soil. These rapidly-growing roots appeared to be favourable objects upon which to study the phenomenon of growth. The root apices were carefully marked with small dots of a black pigment which would not wash away with the rain. It was found that the total growth of a root during a day averaged about 7 cm. This would imply (if the conditions remained constant) that such a root would grow 20 metres in ten months.

Growth is most marked at the apex of the root, and gradually lessens from point to point behind this. This falling off of growth is not regular, however, and there is no single zone of maximum growth to be observed.

Growth is much slower during the day than in the night. Between the hours of 4 P.M. and 8 A.M. twice the growth takes place in the zone 0–10 cm., and three times the growth in zone 10–20 cm., compared with that which is observed in these regions during a similar period of time

in the daytime. This difference between the growth which takes place during the day and the night cannot be attributed to the influence of light and darkness respectively, as experiments showed very little effect upon the growth when the roots were artificially darkened. Most probably the higher transpiration during the day determines the slower growth of the roots. No well-defined negative or positive phototropism or geotropism is exhibited by these roots.—*R. B.*

Cistus × Loreti (*Bot. Mag.* tab. 8490).—Garden origin. Family *Cistaceae*. Cross between *C. ladaniferus* and *C. monspeliensis*. Shrub, 4 feet high. Leaves $2\frac{1}{4}$ inches long. Inflorescence umbellate, 3-4 flowered. Petals 5, $1\frac{1}{4}$ inch across, white, with yellow basal spot.

G. H.

Citrus, A Knot of Citrus Trees caused by Sphaeropsis tumefaciens. By Florence Hedges and L. S. Tenny (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 247).—Knots caused by the fungus *Sphaeropsis tumefaciens* occur on orange, pomelo, lemon, tangerine, and *Citrus trifoliata*. Affected branches are girdled by the tumours, and the branch above the knot ultimately dies. Knots appear in any season regardless of weather conditions, and trees of all ages are attacked.

There is no external evidence of the fungus, but microscopical examination shows the presence of mycelium in all the different tissues of the stem, producing black areas if present in abundance.

The pycnidia, as they have been observed in the host, are subglobose, papillate, dark brown or black, ostiolate, closely crowded together or solitary. They are at first covered by the epidermis but finally break through the epidermis. The pycnosporos are large yellowish or colourless, and variable in size. Spermatia occur in the pycnidia or in separate spermatogonia, but their germination has never been observed. The disease can spread from tree to tree, and the author recommends the burning of all diseased tissue, and the careful selection of sound trees for grafting purposes.—*D. M. C.*

Citrus Fruits, Diseases of. By P. H. Rolfs, H. S. Fawcett, B. F. Floyds (*U.S.A. Exp. Stn., Florida, Bull.* 108; Nov. 1911).—Various diseases of citrus fruits are described, also injuries due to spraying and wrong treatment.

Of the fungoid diseases two stem-end rots, *Phomopsis* sp. and *Diplodia natalensis* (which cause great loss by dropping of the fruit), the black rot inside the fruit at the stem end, and a third black rot at the blossom end seem to be serious.

During transit and in storage *Penicillium italicum* and *Penicillium digitatum*, both wound parasites, are answerable for considerable damage and loss.

Methods of control are given when known.—*D. M. C.*

Citrus Fruits, The Cause of Stem-end Rot of. By H. S. Fawcett (*Phytopathology*, ii. p. 109; June 1912; 2 plates).—Dark brown, reddish-brown, or black discoloration appears about the base of the fruit, which has usually fallen previously. The rotting often proceeds after packing. The fungus causing the rot is a new species named *Phomopsis citri*, and has been isolated and infection experiments carried out with it.—F. J. C.

Citrus Scab. By H. S. Fawcett (*U.S.A. Exp. Stn., Florida, Bull.* 109; May 1912).—Citrus scab is caused by *Cladosporium citri*. It attacks sour oranges and lemons badly, but only disfigures tangerines, grape-fruit, and rarely sweet orange.

It can be prevented by removing all sour orange or lemon sprouts, by pruning all scabby young growth, and by spraying with ammoniacal copper carbonate in bad attacks.—D. M. C.

Clerodendron Bakeri (*Bot. Mag.* tab. 8474).—W. Tropical Africa. Family *Verbenaceae*, tribe *Viticeae*. Shrub, 4 feet high. Leaves oblong-elliptic, $3\frac{1}{2}$ –8 inches long. Cymes densely many-flowered. Flowers white, $\frac{3}{4}$ inch across. Fruit black.—G. H.

Cocculus trilobus (*Bot. Mag.* tab. 8489).—Eastern Asia. Family *Menispermaceae*, tribe *Cocculeae*. Shrub, climbing. Leaves petiolate, blades ovate, $2-3\frac{3}{4}$ inches long. Cymes 1-sexual, green. Drupes, 2–4 to each flower, subglobose, $\frac{1}{4}$ inch diameter, blue-black. G. H.

Coelogyne cristata (*Bot. Mag.* tab. 8477).—Temperate Himalaya. Family *Orchidaceae*, tribe *Epidendreae*. Herb, epiphytic. Leaves lanceolate, 5–12 inches long. Scapes 6–8 inches long, racemes 5–7 flowered. Flowers white, the lip with yellow crest.—G. H.

Coelogyne elata. By E. B. Behnick (*Orchis*, vol. vii. pt. ii. pp. 24–25; 1 plate).—This decorative orchid is found in Nepal, Sikkim, and Sarjeetal from 3700 to 6000 feet above sea level. The flowers are white, with orange markings on the lip.—S. E. W.

Coelogyne Lawrenceana. By E. Miethe (*Orchis*, vol. vii. pt. iv. pp. 58–59; 1 plate).—This beautiful Orchid comes from Annam, and is grown in a temperate house. The flowers are borne on slender stems. The petals and sepals are pale greenish-yellow; the large lip is orange, passing to brown, but white in front.—S. E. W.

Coffee. By T. B. McClelland (*U.S.A. Exp. Stn., Porto Rico, Ann. Rep.*, 1911, pp. 28–30).—As coffee seed does not long keep its viability, experiments were made to see if it might be longer preserved by excluding the moist air of the tropics. The conclusions arrived at were that the viability of coffee seed is destroyed by very severe drying, and that a certain amount of moisture as yet undetermined is necessary for its prolongation.—A. P.

Columnea glabra (*Bot. Mag.* tab. 8453).—Costa Rica. Nat. Ord. *Gesneriaceae*, tribe *Cyrtandreae*. Shrub, to 2 feet high, branching above. Leaves clustered towards the ends of the twigs, 1-1½ inch long. Flowers solitary in the upper axils; corolla, 3 inches long, scarlet.—*G. H.*

Copper Sulphate, Sale of Impure (*Jour. Bd. Agr.* vol. xx., No. 2, pp. 133-134).—A note on the adulteration of copper sulphate with iron sulphate. The presence of the latter substance in copper sulphate may be readily determined by dissolving a small quantity in water and adding ammonia, the solution being constantly stirred until a deep blue liquid is formed. Any quantity of brown flecks floating in this blue liquid indicates the presence of so much iron that the copper sulphate should be subjected to a proper analysis before use. The desirability of obtaining a guarantee of 98 per cent. purity from the seller is pointed out.—*A. S.*

Cornus controversa (*Bot. Mag.* tab. 8464).—Himalaya and E. Asia. Family *Cornaceae*, tribe *Corneae*. Tree, 30-40 feet high. Leaves ovate-elliptic, 3-6 inches long. Inflorescence corymbose, 7 inches wide. Flowers white.—*G. H.*

Cotton, Egyptian, The Branching Habits of. By Argyle M'Lachlan (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 249; Sept. 20, 1912; plates).—That the cotton plant produces two distinct types of branches which are variously developed in the different varieties and types of cotton and under different conditions of growth has been known for several years. The excessively large size of the vegetative branches on Egyptian cotton plants grown under irrigation in the Colorado River Valley in Arizona and California occasions difficulties in cultivation and harvesting, and causes the development of normal fruiting branches to be postponed. This paper gives the results of a study of the subject undertaken with the view of establishing the possibility of cultural control of the production and development of either vegetative or fruiting branches. The matter is still in the experimental stage, but a method of recording branching habits of cotton by means of diagrams has been devised. The diagrams show the position of branches, the development of fruiting branches and the stature of plants, and promise to be of value as records in the cultural and breeding study of cotton.—*M. L. H.*

Couch Grass, Poisonous. By J. H. Maiden (*Agr. Gaz. N.S.W.*, vol. xxiii. pp. 295-296; 1 plate).—Blue couch grass (*Cyanodon incompletus*) sometimes contains hydrocyanic acid and is poisonous. Its culms have two or three nodes; the ligule is membranous and the rachilla not produced. The non-poisonous couch grass (*C. Dactylon*) has many noded culms, with the leaves crowded at the base; ligule a ciliate rim; rachilla produced.—*S. E. W.*

Cowpeas Growing in Missouri. By M. F. Miller (*U.S.A. St. Bd. Hort. Missouri*, vol. x., no. 1; Jan. 1912; plates).—It is pointed out that the cowpea is a plant that is not sufficiently appreciated by the Missouri farmer. Its value as a soil renovator, as a green manure crop, as a catch crop, as a pasture and as a regular hay crop, gives it a place in Missouri agriculture which warrants its wide acceptance by farmers. Its wide adaptation to the soils and to the climatic conditions common to Missouri make it a crop that can be readily grown in practically every part of the State, and there is little doubt that its use is destined to a great increase. Certain drawbacks have hitherto kept it from taking the place it deserves. Among these are the high cost of the seed and the difficulty in curing the hay. The gradual introduction of cowpea shellers that will release the peas without cracking them will undoubtedly overcome the first of these difficulties to a considerable extent, while proper methods of handling the hay will in a great measure do away with the latter drawback. The writers' assertions are backed up by articles contributed by other experts on the value of the cowpea in building up the soil, on the feeding value of the cowpea, &c., and directions are given for the preparation of the soil, on the order of the cowpea in a rotation of crops, and for its cultivation.

The bulletin ends with a short note on the soy-bean.—*M. L. H.*

Crown Gall, The Structure and Development of: a Plant Cancer.

By Erwin F. Smith (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 255; 1913).—This is a bulletin on the histology of crown gall (caused by *Bacterium tumefaciens*).

The writer has experienced considerable difficulty in differentiating the organism in stained sections. The best results have been obtained with material impregnated with chloride of gold.

Diseased tissue was found to stain deeply with potassium chromate and neutral ammonium chromate, whereas normal tissue was only feebly stained.

A general summary of previous work on this organism by the same author is given.

The bacterium is a soil organism and a wound parasite, and the author considers the relation between host and parasite to be one of symbiosis, in which the parasite has the advantage. The organism can be easily isolated from the tissues of the gall and grows readily on the ordinary culture media.

The bacteria are not abundant in the cells; and they occur inside the cell but outside the nucleus. The author considers that the injury is mostly due to the by-products formed during the development of the organism and the reactions set up by the cells against the intruding organisms.

A large number of plates of microphotographs of diseased tissue are given.—*D. M. C.*

Cytisus × **Dallimorei** (*Bot. Mag.* tab. 8482).—Family *Leguminosae*, tribe *Genisteae*. A cross between *C. scoparius* var. *Andreanus* and the White Portugal Broom, *C. albus*. Shrub, 6–8 feet high. Leaves uni- or trifoliate. Flowers pale purple touched with rose; wing-petals rich crimson. Obs.—The yellow has almost entirely disappeared.—*G. H.*

Cytisus nigricans (*Bot. Mag.* tab. 8479).—Europe. Family *Leguminosae*, tribe *Genisteae*. Shrub. Leaves 3-foliolate. Racemes terminal, 6–7 inches long. Corolla yellow.—*G. H.*

Dendrobium Imthurnii (*Bot. Mag.* tab. 8452).—New Hebrides. Family *Orchideae*, tribe *Epidendreae*. Herb, epiphyte. Leaves elliptic-oblong, 3–4 inches long. Flowers medium size, white; labellum three-lobed, 1 inch long.—*G. H.*

Dendrobium Schuetzei (*Bot. Mag.* tab. 8495).—Philippines. Family *Orchidaceae*, tribe *Epidendreae*. Herb, epiphyte, 6–16 inches high. Leaves 3–4 inches long. Peduncles subterminal, few-flowered. Flowers large, 3 inches across, white lip, with green at the base.—*G. H.*

Desmodium Species suitable for keeping down Weeds and manuring the ground in Tropical Cultures. By H. Harms (*Not. König. Bot. Berlin*, vol. v. no. 50, pp. 308–318; Jan. 1913; with 1 text figure).—In tropical agriculture low-growing bushes or herbaceous plants have been planted with success between the growing crops (especially when these consist of trees) in order to keep down the weeds and to prevent the heavy rains washing the earth from the roots. In the Asiatic caoutchouc culture, for example, *Passiflora foetida*, *Crotalaria striata*, *Mimosa pudica*, *Desmodium triflorum*, &c., have been used for this purpose with advantage.

Leguminous plants are particularly to be recommended for inter-planting since, owing to the possession of root-nodules, they will enrich the soil with nitrates as well as restrict the growth of weeds.

In East Africa several low-growing species of *Desmodium* have been very successfully used between various trees which were being cultivated. *D. hirtum*, *D. barbatum*, *D. adscendens*, *D. lasiocarpum*, *D. triflorum*, *D. scalpe*, *D. polycarpum*, *D. tortuosum*, as well as some other plants, are systematically described in this contribution.—*R. B.*

Deutzia longiflora (*Bot. Mag.* tab. 8493).—Western China. Family *Saxifragaceae*, tribe *Hydrangeae*. Shrub, 3–7 feet high. Leaves lanceolate, $1\frac{1}{2}$ – $3\frac{1}{2}$ inches long. Cymes forming a many-flowered pyramidal corymb, $2\frac{1}{2}$ inches across. Petals ovate, rose-coloured in bud, $\frac{1}{8}$ inch long.—*G. H.*

Dianthus, dwarf species. By W. Irving (*Gard. Chron.* April 19, 1913, p. 254, 7 figs.). A good account from a garden standpoint of 11 species.—*E. A. B.*

Drainage of Agricultural Land. By C. T. Baines (*Jour. Bd. Agr.* vol. xx. no. 1, pp. 26-30).—Method is described, and an estimate of cost is given.—A. S.

Elsholtzia Stauntoni (*Bot. Mag.* tab. 8460).—China. Family *Labiatae*, tribe *Satureineae*. Under-shrub, aromatic, stem 4-5 feet high. Leaves $3\frac{1}{2}$ - $4\frac{1}{2}$ inches long. Verticillasters 5-10 flowered. Corolla rose-purple.—G. H.

Enological Studies. By William B. Alwood (*U.S.A. Dep. Agr., Bur. of Chem., Bull.* 145 ; Nov. 20, 1911).—The United States Bureau of Chemistry has to perform duties under the Food and Drugs Act which require the possession of definite data on the methods of wine making and of its by-products made in the several wine districts of the country. As a first step a detailed study was made of the chemical composition and general character of the several varieties of grapes grown in the Central and Eastern States, especially those sent to the wineries at Sandusky, Ohio. A chemical study of the commercial wines produced in the middle and eastern wine-growing districts was also found necessary for the purpose of comparing their quality with that of wines made under the direction of the Bureau itself.

The tests were confined to what are called 'American Grapes': that is, native seedlings and crosses produced in America from European species as distinguished from the distinctly European varieties grown so largely in California. A description is given of the tests as carried out in 1908, 1909, and 1910, and elaborately arranged tables are given showing the results of these tests. There is a column for each variety tested, and the results, computed in grammes per cent. of expressed juice, are given under headings for density for total solids, sugar-free solids, sugar as invert sugar, acid as tartaric, the last four headings being quoted for *Average*, *Maximum*, and *Minimum*.—M. L. H.

Epidendrum. By M. Ehinger (*Orchis*, vol. vii. pt. ii. pp. 26-27).—Many species of *Epidendrum* are well worth growing, on account of their delicious perfume, viz. *E. fragrans*, *odoratissimum*, *gracile*, *ionosmum*, and *odoratum*. *E. polybulbon*, *E. ochraceum*, *E. erubescens*, *E. cochleatum*, and *E. vitellinum* are delicate miniatures, remaining in flower for eight to ten weeks. Many of the varieties are found in Mexico, Guatemala, Costa Rica, and in the north of Brazil.—

S. E. W.

Eriopsis Helenae (*Bot. Mag.* tab. 8462).—Peru. Family *Orchidaceae*, tribe *Vandeeae*. Herb, epiphytic, $1\frac{1}{2}$ -2 feet high. Leaves 16-22 inches long. Scapes, erect, curved upwards, 2 feet long. Flowers $1\frac{1}{4}$ inch across, the 5 petals and sepals alike, a little less than 1 inch yellow; labellum, 3-lobed, $\frac{2}{3}$ inch long. Middle lobe white, with purple spots; other lobes yellow.—G. H.

Exerescences, Abnormal, on Wood, Fruit, Foliage, and Roots. By E. Lemée (*Rev. Hort.* July 16, 1912; pp. 336-8; with 16 woodcuts showing examples).—An interesting article, dealing with their origin and nature.—C. T. D.

Explosive, A Safe, Rompertit C. By P. Schmidt (*Oestr. Gart. Zeit.* vol. vii. pt. ix. pp. 343-346).—Rompertit C has been used with success for removing tree stumps and also for making holes for planting trees. The ground is loosened in all directions by the explosion, facilitating the admission of air.—S. E. W.

Fig, Fructification of, by Blastophaga. By G. P. Rixford (*Jour. Econ. Entom.* v. p. 349; Aug. 1912).—An account of the part played by the gall gnat *Blastophaga* in fertilizing the fig. This insect has been introduced into California, and the outlook for the production of the Smyrna fig in that country is said to be very bright.—F. J. C.

Forcing (*Oestr. Gart. Zeit.* vol. vii. pt. ix. pp. 330-331).—Excellent results were obtained with Lilacs, *Quercus pedunculata* var. *fastigiata*, *Fraxinus excelsior*, *Carpinus Betulus*, *Corylus Avellana*, and *Magnolia Alexandrina* under the following treatment:—The shrubs are dried for three days at a temperature of 79° F., and are then placed in Knop's solution. This liquid consists of a mixture of 1 part by weight of magnesium sulphate, 1 part potassium phosphate, 1 part potassium nitrate, and 4 parts of calcium nitrate dissolved in water (quantity not given). The dormant period of plants grown in pots is curtailed if they are repeatedly watered with Knop's solution. A Japanese oak treated in this way came into leaf in January instead of March.—S. E. W.

Forestry in Nature Study. By Edwin R. Jackson (*U.S.A. Dep. Agr., Farm. Bull.* 468, 12 figures).—This bulletin shows how the study of trees in the forest—not study of forest trees—may be included in a Nature Study Course.

After a paragraph on "methods" of teaching and the value of the subject the author gives a scheme of work for six grades or classes. Each scheme is divided for three terms. These schemes are well worth the notice of nature students and teachers in this country. The study of trees is meant to be a part of a general scheme in Nature Study and not a complete scheme in itself.

The bulletin gives a few experiments which are simple but instructive. The suggestions for field trips, a forest calendar, and a museum are excellent.

The appendix contains a list of reading books suitable for children, reference books for teachers, and a key to the chief forest trees.

The whole work is one which must give infinite pleasure to Nature Study teachers and will surely help to make one's work interesting and successful.—W. W.

Fruit-keeping, Problems affecting. By E. Meeking (*Jour. Dep. Agr. Vict.* March 1913, pp. 174-178).—Problems being investigated in Canada and U.S.A.: (a) The effects of various methods of picking and handling fruits. (b) The influence of different methods of packing, both with respect to the systems under which the fruit is packed, and also the style of package used. (c) The results of applying cool storage at various periods after fruit is picked. (d) A study of the physiological and chemical changes which take place in fruits, both under cool storage transportation and under ordinary conditions. (e) The effects of punctures, bruises, and abrasions of the skin on the keeping qualities of fruits. (f) The reason why fruits vary in keeping qualities, even when subjected to similar treatment regarding cultivation, harvesting, packing, and transportation.

These investigations show the very great importance of careful handling in picking and sorting, also that the higher the temperature at which the fruit is picked the more speedily should it be placed in cool storage, and the low temperature should be retained till placed on the market.—C. H. H.

Furcraea elegans, (*Bot. Mag. tab.* 8461).—Mexico. Family *Amaryllidaceae*, tribe *Agaveae*. Under-shrub, stemless. Leaves 40-50, rosulate, 6½-8 feet long. Inflorescence to 25 feet high, bulbiferous. Perianth ¾ inch long, pale purple, at length brownish, lobes very pale green within.—G. H.

Gladioli, New, 'Iris' and 'Jean Ragot.' By S. Mottet (*Rev. Hort.* Jan. 16, 1913; pp. 35-37; coloured plate).—An interesting article on Gladioli generally. The plate depicts two very handsome forms: 'Iris,' bold flowers of a delicate mauve, slightly striped with crimson in centre; 'Jean Ragot,' bright red, with darker radiating streak on, central petal with white base.—C. T. D.

Hats of Vegetable Material. By Dr. Carl Curt Hosseius (*Beih. Bot. Cent. Bd.* 30, Abt. 2, Heft 1, pp. 79-87; 7 figs.).—The author describes fully the shapes and methods of making hats, and gives the species of grass, palm, &c., which are used in all the various countries in which hat-making is practised.—G. F. S. E.

Heliotropium anchusaefolium (*Bot. Mag. tab.* 8480).—South America. Family *Boraginaceae*, tribe *Heliotropieae*. Herb, perennial. Leaves linear-lanceolate. Corolla violet, corolla ¼ inch across, on long, branched scorpioid racemes.—G. H.

Hydrangea rosea-paniculata 'Excelsior.' By L. Foucard (*Rev. Hort.* July 16, 1912; pp. 324-6; 2 illustrations).—This is a cross between *H. hortensis rosea* and *H. p. grandiflora*, and is recommended as extremely floriferous, which the illustration confirms, and of a rich rose colour. The second illustration shows *H. 'Professor D. Bois,'* a vigorous plant with very large individual flowers, also of a deep rose, but not of like hybrid origin.—C. T. D.

Hydrangea Sargentiana (*Bot. Mag.* tab. 8447).—China. Family *Saxifragaceae*, tribe *Hydrangeae*. Shrub, 6–7 feet high. Leaves 6–12 inches long. Corymb, dense-flowered, 5–6½ inches across; fertile flowers, before opening, pale violet; barren flowers, 1–1½ inch across, white.—*G. H.*

Hypericum aureum (*Bot. Mag.* tab. 8498).—S.-E. United States. Family *Hypericaceae*, tribe *Hypericeae*. Under-shrub, 2–4 feet high. Leaves oblong, 1¼–3 inches long. Cymes three-flowered. Flowers 1 inch across, yellow.—*G. H.*

Hypericum Kalmianum (*Bot. Mag.* tab. 8491).—N. America. Family *Hypericaceae*. Shrub, 1–2 feet high. Leaves 2 inches long. Flowers ¾ inch across.—*G. H.*

Impatiens Herzogii. By S. Mottet (*Rev. Hort.* Jan. 1, 1913; pp. 11–12; 1 illustration and coloured plate).—The former represents a handsome plant about 2½ feet high, the latter a truss of six salmon-red flowers, individually about 2 inches in diameter. Highly recommended.—*C. T. D.*

Indian Corn Seed in West Virginia, Condition of, and How to Test it (*U.S.A. Exp. Stn., West Virg., Circ.* 5; April 1912; plate).—The spring in which this circular appeared followed after a wet October and a sharp early frost, and the writer impresses upon farmers that if they want to give themselves any chance of securing a good crop of Indian corn it is imperatively necessary to test the ears of corn that are to be used for seed. He gives directions for this testing and declares that, as it does not require more than 15 good ears of corn to plant an acre of ground, the average West Virginian farmer can test all the seed he will want in a single evening.—*M. L. H.*

Indian Corn, Native Seed. By E. G. Montgomery (*U.S.A. Exp. Stn., Nebraska, Bull.* 126; March 1912; plates).—The writer states that during the past ten years there has been a general demand for information regarding the relative values of different varieties of corn, of various types of ear, and of seed from different regions. The experience of farmers has been that seed corn, brought from one region to another, will often not give good results the first year in the new locality, though sometimes it does excellently after a few years, or when it is “adapted.” It is easy to understand that in an immense country like the United States, where there is to be found almost every variety of climate and soil, the same type or strain of seed could not possibly be the one best suited to each of these sets of widely differing surroundings. This bulletin gives the results of some experiments in acclimatizing Indian corn seed procured from other parts of the Northern States at the experiment station in Nebraska.

The writer concludes that it will be safer for Western growers to try to improve strains of their native seed rather than to import even from the Eastern part of their own State.—*M. L. H.*

Indian Corn, Water Requirements of. By E. G. Montgomery and T. A. Kiesselbach (*U.S.A. Agr. Exp. Stn., Nebraska, Bull.* 128; May 8, 1912; plates).—For several years the water requirements of Indian corn have been studied at the Nebraska station. This bulletin embodies the results of the latest experiments, which are described, and tabulated analyses are given. The corn was grown under glass in special cases devised for the work, and a brass coil was used to distribute the water throughout the soil mass. The cans were kept at five different degrees of saturation. The results showed that the lowest water requirement per unit of dry weight was 45 to 60 per cent., and 60 per cent. saturation was found to be the optimum for a large yield. Hourly and daily records were kept on water loss from the plants and on evaporation from a free water surface. The records show a very close correlation. The daily water loss fluctuated several hundred per cent., but was closely correlated with changes in temperature, humidity, and wind velocity. In all cases "transpiration" appeared to be essentially "evaporation." Data have also been secured for several years on the relation of water loss to leaf area and to dry weight. Water loss is found to be more closely related to leaf area than to dry weight. The experiments included some as to the effect of added manure on the water requirements of the plants. These showed that when manure was added to soil of three degrees of fertility the water requirement was decreased, the greatest decrease occurring with the originally least fertile soil. With the originally fertile soil the decrease was small, and there is some doubt whether, under field conditions, adding manure to soils of good fertility would decrease the water requirements at all.—*M. L. H.*

Insect Attacks on Fruit Trees and Bushes, Some New and Unusual. By F. V. Theobald (*Jour. Bd. Agr.* vol. xx. No. 2, pp. 106–116).—The Apple Leaf Sawfly (*Lygaeonematus moestus*, Zaddach), which is new to Britain, is mentioned as occurring in Hampshire and Berkshire.

The occurrence of two species of aphides hitherto undescribed is recorded. One species (*Myzus fragariae*, Theobald) attacks strawberries, and the other (*Rhopalosiphum Brittenii*, Theobald) currants and gooseberries.

The Beech Orchestes (*Orchestes fagi*, Barends), which normally attacks the leaves of the Beech, is reported as having caused serious damage to apple fruits in a Devonshire garden.

The Ash and Willow Scale (*Chionaspis salicis*, Linn.) has added yet another plant to its already long list of hosts, since at Woburn and at Wye it has attacked currants.

The Garden Chafer (*Phyllopertha horticola*, Fabr.), so well known as a destructive pest, in its larval stage, of grass and roots, is reported as attacking apple fruits in its adult stage; whilst mention is made of the fact that the Board of Agriculture have records of this beetle

attacking not only apples, but in addition pears, strawberries, raspberries, and currants.

The caterpillars of the common V-Moth (*Halia wavarica*, Linn.) have occurred abundantly on currants and gooseberries at Woburn.

The Sycamore Coccus (*Pseudococcus aceris*, Sign.) is recorded from two localities as attacking apple trees, and the Pear Leaf Curling Midge (*Cecidomyia pyri*, Bouché), which, although hitherto known to attack pears, has never been complained of, is reported as having increased to such an extent in one locality near Maidstone that it has done considerable harm.—A. S.

Insecticide Industries in California. By C. W. Woodworth (*Jour. Econ. Entom.* v. p. 358 ; Aug. 1912).—A law has recently been enacted demanding the statement upon the label of the composition of all insecticides sold in California.—F. J. C.

Insectivorous Birds of N.S. Wales (*Agr. Gaz. N.S.W.* vol. xxiii. pp. 663–664 and 753–754 ; 4 col. plates).—Coloured illustrations of the Short-billed Tree Tit, Blue Jay, Babbler (*Pomatostomus*), and Brown Tree Creeper are given.—S. E. W.

Insectivorous Birds of N.S. Wales (*Agr. Gaz. N.S.W.* vol. xxiv. pp. 322–323 ; 2 coloured plates).—Coloured pictures are given of the Spotted Ground Bird (*Cinclosoma punctatum*) and the Mountain Thrush (*Oreocincla lunulata*).—S. E. W.

Insects, Injurious and Beneficial, in California. By E. O. Essig (*Monthly Bull. Calif. Com. Hort.* II. Nos. 1 and 2 ; 351 pp. ; Jan. 1913 ; figs.).—A very full manual of economic entomology, with descriptions and treatment of insects injurious to plants.—F. J. C.

Iris, a hunt for, in Dalmatia. By W. R. Dykes (*Gard. Chron.* May 17, 1913, p. 321, continued p. 322 and p. 363).—Interesting account of finding wild forms in wide range of colours, including an albino of *I. pallida* near Ragusa, *I. germanica* vars. at Melkovic, *I. pumila* at Zara, and *I. illyrica* at Zeugg, but the typical *I. pallida* was not found.—E. A. B.

Iris caroliniana (*Bot. Mag.* tab. 8465).—Virginia and Carolina. Family *Iridaceae*, tribe *Irideae*. Herb. Leaves 3 feet long. Perianth-tube green ; outer segments of the limb dependent, obovate, over 1 inch long, lavender-purple, with yellow base.—G. H.

Irises, New. By W. R. Dykes (*Gard. Chron.* July 12, 1913, p. 25).—Notes on hybrids, especially *tenax* × *Wilsonii*, *tenax* × *Purdyi*, *chrysographus* × *Forrestii* and *Wilsonii* × *sibirica*, apparently raised by the author.—E. A. B.

Iris Oncocyclus 'H. Denis.' By F. Denis (*Rev. Hort.* Sept. 16, 1912 ; p. 424 ; coloured plate).—This is a hybrid of the third degree,

Regeliocyclus Korparib and *Oncocyclus Susiana*, which latter it much resembles. Some interesting notes on the cultivation of the section generally.—C. T. D.

Land, The Use of Explosives in Clearing. By J. F. Kadonsky (*U.S.A. Exp. Stn., Wisconsin, Bull.* 216; Nov. 1911; 20 figs.).—The presence of resins in pine stumps makes their natural decay a very lengthy process, and this bulletin gives the results of investigations into the methods of removing them by the use of explosives.—A. P.

Lands, Peaty Swamp; Sand and Alkali Soils. By C. G. Hopkins, J. E. Readhimer, and O. S. Fisher (*U.S.A. Exp. Stn., Illinois, Bull.* 157; July 1912; 7 plates).—There are immense areas of peaty swamp lands in the northern parts of Illinois, and as a rule they grow poor crops. The field experiments here detailed show the application of potash to these soils to have considerably increased their productive capacity.—A. P.

Leptospermum scoparium, New Varieties of. By D. Bois (*Rev. Hort.* Nov. 16, 1912; pp. 520-1; coloured plate).—This represents two very pretty varieties: one, *L. s. Nichollii*, with an abundance of small deep-rose flowers, the other, *Boscawenii*, raised in Cornwall, with larger flowers, white, with rose-red centre. Both very attractive, of Australian origin, but only suited for mild climates, such as Cornwall, the Scillies, or the West of Ireland.—C. T. D.

Lilies in 1912. By A. Grove (*Gard. Chron.* Jan. 4, 1913, p. 1).—Useful notes on behaviour and cultural requirements of new and rare lilies.—E. A. B.

Lilium candidum (*Rev. Hort.* July 16, 1912; p. 318).—If the stem be severed low down, when the first flowers are just opening, and inserted in soil kept very moist, after a short period of flagging, the plants resume vigorous development and perfect their blooms successively for a fortnight. The foliage, however, becomes yellow and perishes.—C. T. D.

Lilium regale (syn. *L. myriophyllum* Hort., non Franchet.). By E. H. Wilson (*Gard. Chron.* June 21, 1913, p. 416; 2 figs.).—Account of the discovery of and a table of differences compared with, Franchet's type specimen.—E. A. B.

Lime and Magnesia, Effect of various Ratios of, on the Growth of Plants. By P. L. Gile (*U.S.A. Exp. Stn., Porto Rico, Ann. Rep.* 1911; pp. 18, 19).—This has been tested by growing rice in nutrient solutions of the chlorides of these elements, the various ratios of lime to magnesia from 10:1 to 1:10 being tried. The results show that while the ratio appears to exert an action at comparatively high concentrations it does not at low concentrations, at least not within the ratios tried. It appears that the question is not the simple one of a balancing of lime with magnesia, but of these two with all the

other nutrients, and the facts so far ascertained seem to point to the conclusion that the toxicity of an excess of lime or magnesia is due not simply to an unfavourable ratio between these two salts, but to an unfavourable ratio between the salt that is in excess and all the other salts present. In ordinary soils the concentration of all the salts is extremely low, and the toxic action of any one salt in such circumstances would not be expected to become apparent unless it were greatly in excess of all the others. But in alkali soils, where there is a concentrated salt solution, it appears that the ratio of lime to magnesia may be of the utmost importance in determining the growth of plants.

A. P.

Lime for Orchards. By P. J. Carmody (*Jour. Dep. Agr. Vict.* Oct. 1912, pp. 640-641).—On soils rich in lime the wood is matured earlier, and the fruit-buds are more stocky and robust, than is the case with trees grown on soils deficient in lime. It is generally recognized that the trees are not so manageable nor so prolific in bearing in soils where lime is deficient. Though lime plays an important part in the apple and pear tree, it is in the stone fruits that its value is most apparent. It is a familiar fact that in soils rich in lime the stone fruits set their crops well, and are not so prone to cast off their fruit at the period of "stoning" as is otherwise the case. Where trees are making extensive wood growth with abundant foliage there is but little doubt that the application of lime at the rate of 7 to 8 cwt. to the acre would be of pronounced benefit.—C. H. H.

Lime in Relation to Soil Fertility. By John W. Paterson and P. R. Scott (*Jour. Dep. Agr. Vict.* pp. 619-628).—Summary and conclusions: (1) Lime tends to leave the surface soil through various channels, and fresh applications become necessary to maintain fertility. (2) Carbonate of lime is the best form of lime for the soil. (3) Burnt and slaked lime are rapidly changed to carbonate when they are applied to land. (4) The rate at which lime acts depends on its fineness of division. (5) Lime, but especially hot lime, has a good effect upon the mechanical condition of stiff clays. (6) Gypsum also coagulates clay, but it has not the beneficial action of lime in other directions. (7) Lime greatly hastens the production of nitrates. (8) It has a good effect in liberating potash and phosphoric acid, especially when the latter is combined with iron or alumina. (9) Where required by soil, lime produces larger crops. (10) It produces root crops which are of greater feeding value per ton. (11) It may often be a profitable application to grass land. (12) Lime kills sorrel, dock, and other acid-loving weeds. (13) It is specially stimulating to lucerne, clovers, and leguminous plants. (14) Lime will not act if phosphates are deficient. (15) It increases the need, everywhere present, of ploughing-in green manures or stubbles. (16) It facilitates this operation. (17) The surest method of determining the need of lime is to dress trial strips and await results.—C. H. H.

Lime-Sulphur Wash for Use against American Gooseberry Mildew. By E. S. Salmon (*Jour. Bd. Agr.* vol. xix. No. 2, pp. 99–106).—The results are given of a number of experiments conducted at Wye College during the summer of 1911 with the object of ascertaining at what strength (specific gravity) the lime-sulphur wash can be used on the foliage of the gooseberry from May to September without causing injury.—A. S.

Lime-Sulphur Wash for Use against American Gooseberry Mildew. By E. S. Salmon and C. W. B. Wright (*Jour. Bd. Agr.* vol. xix. No. 12, pp. 994–1004).—Experiments were carried out during 1912 on a number of fruit-farms in the Swanley district in order to supplement the information gained as the result of experiments conducted at Wye during 1911, and described in the *Jour. Bd. Agr.* vol. xix., No. 2. In all, 1015 bushes of nine different varieties of gooseberries were sprayed.

“Different varieties of gooseberries differ to a marked degree as regards the susceptibility of the foliage to injury from the wash. It is possible with some varieties, *e.g.* ‘May Duke,’ to spray repeatedly throughout the season with lime-sulphur, at a strength (1·01 sp. gr.) sufficient to prevent the attacks of the American Gooseberry Mildew, without causing any injury to the foliage,” whereas, in the case of some other varieties, *e.g.* ‘Valentine’s Seedling’ and ‘Yellow Rough,’ the susceptibility to injury is so marked that they cannot safely be sprayed with lime-sulphur at all.

It seems probable that some varieties will prove resistant to injury early in the season (May), though susceptible later.

It is concluded that “under ordinary summer weather conditions the ‘strength’ of the lime-sulphur wash should be as follows:—

“For ‘Whinham’s Industry,’ ‘Rifleman,’ ‘Warrington,’ and ‘May Duke,’ 1·01 sp. gr.

“For ‘Lancashire Lad,’ 1·005 sp. gr.

“For ‘Crown Bob,’ 1·005 sp. gr. early in the season; later in the season some injury may be caused.

“For ‘Berry’s Early,’ 1·005 sp. gr. early in the season, when the bushes are more or less shaded; later in the season injury is caused by the wash at this, and at lower, concentrations.”—A. S.

Linnaea borealis. By Emil Giger (*Beih. Bot. Cent. Bd.* 30, Abt. 2, Heft 1, pp. 1–78; 11 tables, 3 figs.).—The author gives a thorough “monographic study” of this interesting plant, with a map showing the distribution. The chief points considered are as follows: Nomenclature and systematic (including Wittrock’s varieties); morphology of vegetative organs; anatomy of stem, root, and leaf; development of flower; abnormal flowers; development of anthers, pollen, carpels, ovules, and embryo; pollination and fertilization (including a list of insect visitors); germination and seedling. Lists are also given of the various Conifers in Europe, Asia, and America,

and of the other plants in whose company *Linnaea* has been observed.

He notes that in Asia and America it is usually found either along with the same species or with the characteristic species for either continent of the same genus.

When forests are cut down, the *Linnaea* disappears along with other shade plants, and cannot establish itself again in competition with grasses and herbaceous woodland plants. Besides the usual habitat in coniferous woods, it has been observed in Beech forest in Schleswig-Holstein and in Birch woods in Scandinavia. It also occurs in Arctic dwarf shrub heaths (Lapland, Alaska) and in the Arctic Tundra. A list of localities is given, and also a bibliography of 240 references.

G. F. S. E.

Lissochilus Andersoni (*Bot. Mag.* tab. 8470).—Tropical West Africa. Family *Orchidaceae*, tribe *Vandeeae*. Herb, terrestrial. Leaves, 2 narrow, 10–12 inches long. Flowers $\frac{3}{4}$ –1 inch long, pale sulphur-yellow.—G. H.

Lomaria ciliata. By H. Koehler (*Gartenflora*, vol. lxii. pt. iii. pp. 66–67; 1 fig.)—*Lomaria ciliata* is a variety of *L. gibba*. It is grown in the greenhouse, close to the glass, and appreciates regular doses of weak liquid manure. It is propagated by sowing the spores.

S. E. W.

Magnolia salicifolia (*Bot. Mag.* tab. 8483).—Japan. Family *Magnoliaceae*, tribe *Magnolieae*. Tree, deciduous, 15–20 feet high. Leaves oblong-lanceolate, 3–6 inches long. Petals 6, pure white, 2–2 $\frac{1}{4}$ inches long.—G. H.

Magnolias, Deciduous, Old and New World Species. By Emile Sadeceau (*Rev. Hort.* Aug. 16, 1912, pp. 369–373; and Sept. 16, 1912, pp. 426–8, on the New World species; 4 illustrations).—A long and interesting article, treating of 15 species in all, with special reference to an article on the subject in *The Garden* (Nov. 10, 1894) by W. I. Beard.—C. T. D.

Maize. By A. H. E. McDonald (*Agr. Gaz. N.S.W.* vol. xxiv. pp. 326–330).—Maize makes heavy demands on the fertility of the soil. It requires moisture, humus, and the usual plant foods. The latter can be supplied by the following mixture: superphosphate 4 lb., bone dust 2 lb., dried blood 3 lb., and potassium sulphate 1 lb. Apply 1 $\frac{1}{2}$ cwt. to the acre. The fertilizer is applied with the combined seed and fertilizer drill.—S. E. W.

Mango, The Oahu. By J. E. Higgins (*U.S.A. Exp. Stn., Hawaii, Ann. Rep.* 1911; pp. 35–38; 2 plates).—A seedling tree six or seven years old has produced nearly seedless fruit. The husk was present but the seed presented an undeveloped condition with often just the seed-coat present, about 75 per cent. of the crop having no viable seed.

It was a handsome fruit with a large proportion of flesh. No mango weevil was found in these mangos and the result of an attack of this pest on seedless fruits will be watched with interest as it is the seed upon which the larva feeds. The 'Oahu' is considered worthy of propagation as a basis for breeding towards complete seedlessness.—*A. P.*

Mangrove Trees: At what Period of the Year should these be Peeled to obtain Tannin-Bark? By G. Volkens (*Not. Königl. Bot. Berlin*, vol. v. No. 50, pp. 279–282; Jan. 1913).—The examination of mangrove bark from East Africa in 1910 showed that the quantity of tannin contained in the bark was about the same at whatever time of the year or the day the bark had been gathered. The colour which is imparted to the leather varies, however, with the date at which the bark is collected. The barks of *Rhizophora* and *Bruguiera* collected towards the end of the year produce a leather which is much lighter in colour and less inclined to a reddish tint than the bark gathered earlier.

Volkens finds, as a result of his inquiry, that the material which colours the leather red is absent from the bark when the trees are just expanding their leaves, and that consequently (in order to avoid the undesirable red coloration of the leather) this period is the most suitable at which to gather the bark. In East Africa the new leaves are expanded in November and December, but in other parts of the world this process takes place at other times of the year.—*R. B.*

Mendelism and Lamarekism. By A. Menuissier (*Rev. Hort.* July 16, 1912; pp. 332–4).—Interesting extracts from *Le Bulletin scientifique de la France et de la Belgique* relating to a controversy between Dr. Haagedorn, champion of Mendelism, and M. E. Rabaud on the neo-Lamarckian doctrine. The remark is finally made that while the Mendel theory has led to very practical results, the counter hypotheses have failed to do so.—*C. T. D.*

Mesembryanthemum, Leaf Tips of. By Dr. O. Oberstein (*Beih. Bot. Cent. Bd.* 29, Heft 2, pp. 298–302; with 2 plates and 3 photographs).—The author describes the anatomical details of the peculiar hairlike papillæ (emergences) found on the tips of the leaves of this genus. Similar structures occur in Bruniaceae. He considers that they protect the very young growing leaf from loss of water by evaporation, and that they are not able to absorb water in the form of mist, as has been suggested by others. Later on in life the corky mesophyll takes on this function. The bundle of papillæ is especially conspicuous when the leaf is not larger than a composite seed.

G. F. S. E.

Mesembryanthemum Pearsonii (*Bot. Mag.* tab. 8463).—S. Africa. Family *Ficoideae*, tribe *Mesembryeae*. Herb, perennial, 1½–2 inches high. Leaves 2 connate, 1¼ inch long, 1¾ inch wide, thick, flat on inner face, gibbous on outer. Flower solitary. Corolla 1¼ inch across, outer petals linear, mauve-purple; inner smaller, dull yellow, streaked with purple.—*G. H.*

Muehlenbeckia complexa (*Bot. Mag.* tab. 8449).—New Zealand. Family *Polygonaceae*, tribe *Coccolobeae*. Herb, with thin, woody, slender stems forming dense tufted masses, or climbing over shrubs, &c. Inflorescence, short spikes; perianth white, 2 lines long.—*G. H.*

Nitrification, Influence of certain Soil Constituents upon. By John W. Paterson (*Jour. Dep. Agr. Vict.* July 1912, pp. 393-400).—(1) Mild lime is an effective means of promoting nitrification, and its action begins at once. (2) It is a safe dressing both as regards quantity and time of application. (3) Caustic lime requires greater caution in its use. (4) It should not be applied too near the time of seeding. (5) It should not be applied during the growth of any crop. (6) It should be used in smaller quantities than mild lime. (7) It will probably have a similar action to mild lime eventually. (8) Magnesium carbonate in a limestone may or may not damage crops, but it appears to favour nitrification. (9) Red and brown soils, other things being equal, favour nitrification, as they contain a slow-acting base in the form of iron rust. (10) Gypsum is a slow form in which to apply lime. (11) Superphosphate may prove a useful aid to nitrification on some soils. (12) Salt delays nitrification. (13) Sour soils are very unfavourable to nitrification. (14) Ploughing in of green or fresh stable manure may cause a temporary shortage of nitrates, particularly on damp soil. (15) The nitrifying organisms are weakened by continued drought, and where the surface soil becomes unduly parched in a dry spell nitrification will begin slowly after rain comes.—*C. H. H.*

Nymphaeas 'Mme. Paul Cazeuue' and 'Mme. Abel Chatenay.' By G. T. Grignan (*Rev. Hort.* Feb. 16, 1913; p. 84; coloured plate).—Two very beautiful Water-lilies. The first-named double, white, suffused with rose, the second also double, of a delicate pale blue, central stamens bright yellow, with blue recurved tops. Under-surface of leaves veined pink.—*C. T. D.*

Olive Knot Disease, Method of Spreading. By W. I. Horne, W. B. Parker, and L. L. Daines (*Phytopathology*, ii. p. 101; June 1912).—Olive knot disease is caused by *Bacillus Savastanoi* (*JOURNAL R.H.S.* xxxiv. p. 586). The authors consider that the bacilli are distributed by rain spattering the moist exudations which proceed from the knots and which contain living bacilli. These find their way into minute cracks and set up the disease.—*F. J. C.*

Oncidium pulchellum, Hook. By E. Miethe (*Orchis*, vol. vi. pt. viii. pp. 149-151; 1 fig.).—The orchid described by Heydt in *Orchis*, pt. iv. vol. vi., is not *O. pulchellum*, as is seen from the illustration accompanying this article.—*S. E. W.*

Oranges, Sooty Mould or Fumagine on (*Agr. Gaz. N.S.W.* p. 989).—Sooty mould on oranges is caused by the fungus *Capnodium citricolum*, which attacks the leaves, branches, and fruit. Prune off and burn the diseased branches, spray with resin wash or fumigate with hydrocyanic acid for 40 minutes.—*S. E. W.*

Orchids, Garden. By R. Schlechter (*Orchis*, vol. vi. pt. vii. pp. 112-119; 2 plates).—*Coelogyne formosa* resembles *C. speciosa*, but differs in the shape of the lip and the waved crest. It is found in the forests of Sumatra, about 4000 ft. above sea level.

Lueddemannia Vyverreana, from Peru, differs from *L. Pescatorei* in the shape of the labellum.

Bulbophyllum pleiopterum comes from Madagascar. It bears a close resemblance to *B. clavatum*.

Maxillaria Fuerstenbergiana is closely related to *M. melina*. It bears beautiful snow-white flowers; the sepals are orange yellow, and the labellum is edged with red.

M. Hennisiana is probably a native of Colombia, resembling *M. ochroleuca* in habit. It bears numerous sweet-smelling, yellowish, white flowers, and is well worth cultivation.

Brassia cyrtopetala has yellowish flowers with brown spots on the sepals, petals, and labellum. It is nearly related to *B. Lanceana*.

S. E. W.

Orchid Hybrids. By A. Hefka (*Oestr. Gart. Zeit.* vol. viii. pt. i. pp. 2-6; pt. iii. pp. 66-68; 7 figs.).—Many new hybrids have been obtained in the Imperial orchid-houses at Schönbrunn; among the most striking are the hybrids of *Laeliocattleya elegans* var. *Turneri* × *Cattleya aurea*, e.g. *L.-c. schoenbrunnensis* var. 'Erzherzog Franz Ferdinand' (white throat and petals and dark purple lip). In the variety 'Kaiserin Elisabeth' the white throat and petals are shot with yellow and the lip is pale purple. Both varieties flower in autumn and bear six flowers on a stem.

Cattleya Boweringiana × *maxima floribunda* hybrid is very floriferous, beginning to bloom in late summer, bearing violet flowers.

'Herzogin von Hohenberg' is a noble variety of *Laeliocattleya*. It bears white flowers with a purple lip, six on a stem, in autumn.

'Peter Rosegger' also flowers in autumn, bearing five pink blooms on a stem. It is a cross between *C. Harrisoniana* and *L. Perrinii*.

Cattleya × *Hueliana* (*Boweringiana* × *Eldorado* var. *alba*) is in flower from August to November. It resembles *Boweringiana* in growth. The flowers are violet-purple.—S. E. W.

Orchid Hybrids. By O. N. Witt (*Orchis*, vol. vii. pt. ii. pp. 18-21; 2 plates).—*Sophrolaelia* × *Psyche*, a hybrid of *Laelia cinnabarina* and *Sophronitis grandiflora*, is smaller than *L. cinnabarina*, which it resembles in many respects. The flowers are larger and more beautiful than those of its parents. They are scarlet in colour.

Cypripedium × *selligerum*, a hybrid of *C. barbatum* and *C. philippense*, flowers at intervals of several years. A photograph of a specimen with four flowering stems is shown in the text.—S. E. W.

Osbeckia stellata (*Bot. Mag.* tab. 8500).—India and China. Family *Melastomaceae*, tribe *Osbeckieae*. Shrub, 2-7 feet high. Leaves ovate-lanceolate. Flowers in few-flowered cymes. Corolla 3 inches across, 4-petalled, lilac-red.—G. H.

Osmanthus Delavayi (*Bot. Mag.* tab. 8459).—China. Family *Oleaceae*, tribe *Oleineae*. Shrub, 8 feet high, evergreen. Leaves $\frac{3}{4}$ inch long, coriaceous. Flowers in terminal clusters, white. Fragrant. G. H.

Palms, On the Growth in Thickness in. By J. C. Schoute (*Ann. Jard. Bot. Buit.* ser. ii. vol. xi. pt. 1, pp. 1–209, with 15 plates and 77 text figs.; 1912).—It is already known that many palms exhibit a long-continued growth in thickness in which the enlargement of single cells of the primary tissue takes a prominent part, but in which the formation of new tissue is insignificant. Very little, however, is known of the exact manner in which this growth in thickness takes place, or of the extent which it attains in the different cases. Moreover, some of the methods of study employed in the past are open to criticism. The present memoir was written in order to fill, to some extent, these deficiencies in our knowledge of this subject. Amongst the numerous interesting results reached by the author the following may be mentioned:

(1) In many palms there is either no secondary growth in thickness of the stem or only an early-secondary growth which is already completed when the stem emerges from its bud-sheath. In other palms a late-secondary thickening occurs; sometimes, however, this only takes place in the basal region of the stem.

(2) So far as it has been studied, all palms show a great similarity in the structure of their stem at the moment when the growth in length of the stem ceases. This is due to the fact that the parenchyma cells of cortex and central cylinder are isodiametric and of about the same size; the sclerenchymatous fibres are also all round in section.

(3) The thickening ring is active in only a few cases when growth in length of the stem ceases; for the secondary growth in thickness this ring has little or no significance.

(4) In one and the same stem the primary condition of the lower region of the stem at an early stage is in several respects different from the primary condition of the later, upper region of the stem. Results obtained from the study of the upper stem-region cannot, therefore, be directly applied (as some previous authors have done) to explain the conditions prevailing in the lower part of the stem.

(5) The secondary growth in thickness of palms is diffuse in character in comparison with the cambial growth in thickness of the Dicotyledons and Coniferae in which it is limited to a definite region.

The physiological advantages and disadvantages to the plant of the diffuse method of growth in thickness are discussed by Schoute. The rich branching of the stem which is found in Dicotyledons and Conifers cannot take place in these stems with diffuse growth but they are able to attain great height whilst they remain comparatively slender. The heavy "heart-wood" of the Dicotyledons is replaced in the Palms by a light, spongy tissue.—R. B.

Pansies and Violas, The Cultivation of, by Allotment Holders, (*Jour. Bd. Agr.* vol. xix. No. 9, pp. 749-750).—The way in which cottagers and allotment holders in the neighbourhood of Hounslow (Middlesex) supplement their income by growing Pansies and Violas for what might be called the suburban gardener's trade is described. The ground is cropped during the summer months with potatoes, beans, peas, &c. When these are removed Pansies and Violas are planted for sale the following spring.—A. S.

Papaya Investigations. By J. E. Higgins (*U.S.A. Exp. Stn., Hawaii, Ann. Rep.* 1911; pp. 26-32; 3 plates).—The Papaya cannot be propagated by cuttings, buds, scions, &c., and the aim of these investigations is to work out methods for the breeding of varieties of desired qualities that can be depended upon to reproduce themselves with reasonable accuracy from seeds, work which is much complicated by the fact that there are dioecious and monoecious forms, with many apparently intermediate ones. With a view to testing the possibilities of close and cross pollination experiments have been made with sixteen different combinations of pollen and stigma, and the conclusions are arrived at that pollination is not always necessary for the production of fruit, and that in the case of a certain tree producing seedless fruit this latter condition was probably not due to a lack of pollination.

A. P.

Peach Aphis. By E. E. Pescott (*Jour. Dep. Agr. Vict.* Aug. 1912, p. 513).—Spray with strong nicotine solution made by soaking tobacco stems in cold water for some days, adding a teaspoonful of caustic soda to a cask of steeping stems.—C. H. H.

Peach, Diseases and Pests. By W. J. Allen (*Agr. Gaz. N.S.W.* vol. xxiii. pp. 346-357; 2 plates, 1 col.).—The Peach aphis (*Aphis persicae niger*) is dark brown or black when adult; it spends the winter on the roots of the trees, and should be treated with tobacco. When the aphis appears on the branches in spring, spray with tobacco wash, hot resin and soda wash, or Sunlight soap wash. The latter is prepared by dissolving a cake of Sunlight soap in 2 gallons of water. Use warm. It does not injure the blossom. McDougall's Insecticide is also excellent.

To destroy Mediterranean fruit fly (*Ceratitis capitata*) hang tins containing kerosene in the trees and burn fallen and infected fruit.

Rutherglen bug (*Nysius vinitor*) is a small active creature about $1\frac{1}{2}$ lines in length. Spray with tobacco wash or weak kerosene emulsion in the early morning and shake the branches over a sheet.

Brown olive scale (*Lecanium oleae*) is destroyed by red oil emulsion.

San José scale (*Aspidiotus perniciosus*) is very destructive; it causes a bright red stain on the fruit. Lime-sulphur or red oil emulsion is applied when the trees are dormant, or just before the buds begin to swell. Red oil emulsion is prepared by boiling 2 lb. of soft soap in 1 gallon of soft water, then add 2 gallons of red oil, stir well

till emulsified, and dilute to 60 gallons, with warm water. Apply as late as possible before the buds start.

The chaff scale (*Diaspis amygdali*) is not unlike rose scale. It is killed by spraying with resin wash, red oil, or lime-sulphur.

Kainit should be dug in above the roots of peaches infested with white ants (*Coptotermes lacteus*).

The yellow peach moth (*Conogethes punctiferalis*) lays her eggs on the half-grown fruit; the grub gnaws its way to the centre. The moth is yellow, with black spots.

Cicada angularis and *Cyclochila australasiae* produce longitudinal slits on the upper branches. The injured parts should be cut out.

The rice weevil (*Calandra oryzae*) causes the unripe fruit to drop off.

Brown rot (*Monilia fructigena*) attacks the fruit, causing it to shrivel, and also the twigs. The diseased twigs and fruit must be removed and burned, and the trees sprayed with dilute lime-sulphur. This is also a remedy for mildew (*Podosphaera oxycantha*), rust (*Puccinia pruni*), and peach curl (*Exoascus deformans*). The last disease is difficult to deal with; remove and burn all curled leaves.

S. E. W.

Peaches, Stop-back of. By E. A. Back and W. J. Price (*Jour. Econ. Entom.* v. p. 329; Aug. 1912).—Stop-back is a term used to describe the condition of peaches in which the terminal bud is killed and the lateral thus forced into premature growth. Various causes have been suggested, but the authors show that the common bug *Lygus pratensis*, well known in Britain as a pest of a variety of plants, is the real source of the trouble. No preventive measures have been tried but lime-sulphur, and a method of pruning which was advocated had no value in ameliorating the trouble, which is usually noticed only after the damage is far advanced.—F. J. C.

Peanut Butter. By W. R. Beattie (*U.S.A. Dep. Agr., Bur. Pl. Ind., Circ.* 98; Oct 14, 1912; plates).—The growing popularity of peanut butter as a food has led to many inquiries concerning the method of its manufacture. It is in reality a very simple preparation, consisting merely of freshly roasted peanuts ground finely and salted to taste. It was first manufactured and offered for sale as a food for invalids. It was later adopted by the strictest sect of vegetarians as a substitute for dairy butter, and has now become a generally recognized article of food among all classes in the United States. Large and well-equipped factories are being used for the manufacture of the butter, but a clean and wholesome product can also be made on a small scale provided good materials are employed and the work is conducted in a sanitary manner. Absolute cleanliness appears to be essential, so much so that peanut butter making cannot be successfully carried on in the same establishment as the earlier cleansing of the nuts, which produces an amount of dust that would be fatal to the butter.

This paper treats of the different strains of peanut, of the equipment of the factory, of roasting, blanching, grinding, blending, bottling, and packing.—*M. L. H.*

Pear Culture in the Prairie Northwest. By C. G. Patten (*U.S.A. Hort. Soc., Iowa, Ann. Rep.* 1912; pp. 160-164; 1 photo).—It is stated that not one variety of the old lists, whether they originated in England, France, Belgium, or the United States, can long endure the coldest winters or hottest summers in the northwest. The writer claims to have obtained a strain or race of hardy pears by natural crosses or inbreeding of the 'Longworth,' 'Seckle,' and 'Chinese Soud'; also by crosses of 'Keiffer' and 'Winter Nélis,' 'Russian No. 15,' and 'Anjou,' and others; and he expects that this new race will provide stocks on which such pears as 'Winter Nélis,' 'Flemish Beauty,' 'Seckle,' &c., can be grown with fair success in a climate where the winter temperature falls 30° to 40° below zero.—*A. P.*

Peat and Muck Soils. By J. A. Bonsteel (*U.S.A. Dep. Agr., Bur. of Soils, Circ.* 65; Aug. 20, 1912).—It is computed that there is still an area of probably 15,000,000 acres in the Eastern United States of unreclaimed deposits of what is called muck and peat. Both these types of soil are formed in the same way, by the disintegration of vegetable matter in swampy low-lying positions in comparatively cool climates. The writer confesses that it is difficult to draw a distinct line of difference between muck and peat, which may even occur with intermediate gradations in the same deposit, but in general peat may be said to consist of brown or black fibrous or cellular remains of organic matter formed chiefly in bogs or ponds, while in muck the organic remains have reached a more advanced state of disintegration, and the accessory mineral matter is more apparent.

The surface features of both peat and muck deposits are almost universally those of a level plain, though when they become partially drained through natural or artificial causes irregularities in shrinkage may give rise to slight differences in elevation. They are always found in depressed areas where the natural drainage is deficient, and thus are always swampy. This fact causes the first difficulty met with in attempting to reclaim these soils. It is only after the installation of drainage systems that either class of material may be brought under cultivation. Even then there is considerable variation in the agricultural adaptability and cropping value of different areas even of the same deposit. It has been the usual experience that areas of muck are more easily reclaimed than areas of peat. This arises from the fact that the more advanced stage of decomposition of the muck, coupled with the universal presence of an appreciable amount of mineral matter, renders it more compact and better fitted to hold the growing crop in an upright position and to furnish a regular and adequate supply of moisture throughout the growing season. The fibrous peat is too loose and too light to maintain any high-growing crop in position; thus Indian corn and even the small grains are liable

to fall down and become lodged. Moreover, the peat is sufficiently fibrous to absorb large amounts of water, which it holds tenaciously within its own cellular structure at the expense of the young crop. It has been found that the nature of the subsoil has much to do in determining the agricultural value of muck deposits, those that occur in limestone regions or which overlie deposits of calcareous marl being the ones most successfully used for the production of general farm crops and for the majority of special crops.

Both peat and muck are primarily adapted to the production of special rather than general farm crops. They are specially favourable for cabbage, celery, lettuce, turnips, table beets, and peppermint. When the conditions are favourable in the way of possibilities of drainage at some times and there is an abundant supply of available water for flooding the beds at others, perhaps the most profitable crop grown upon muck and peat is the Cranberry, but all these special crops necessitate a near and constant market. The best farm crops for land of this nature are Indian corn, oats, buckwheat, and potatoes, but the dark colour of the material and its evident high content of organic matter must not be taken as indications of extraordinary fertility. In practice it has been found necessary to make considerable applications of mineral fertilizers and even of stable manures to such soils before they could be brought to a highly profitable condition of cultivation. It may be that the bacterial condition of these freshly-drained organic soils is not favourable to the growth of certain crops, and that this deficiency is supplied through applications of stable manure. For the production of cabbage, onions, beets, and turnips upon peat and muck it is usually advisable to apply considerable quantities of lime. This may be added in the form of caustic lime, slaked and spread at the rate of about 1 ton to the acre, or by applying 2 to 3 tons to the acre of ground limestone. Where available in any quantity, wood ashes have been found of value for the growing of Indian corn and oats upon muck soils.—*M. L. H.*

Pecans. By W. N. Hutt (*U.S.A. Exp. Stn., N. Carolina*, vol. xxxii. No. 9; Sept. 1911; plates).—A second report on Pecan-growing in the State of North Carolina. The writer states that he did not intend this communication to follow so hard after the former, but events are moving fast in his State in the matter of Pecan-growing. The nut is growing enormously in popularity and the planting of commercial orchards is proceeding apace. At the same time there has been experimental growing at State Test Stations, which have exploded several cherished theories on the subject of the Pecan tree and established some new facts which are of great interest to growers. This bulletin deals with the subjects of varieties, cultivation, propagation, soils, and fertilizers.—*M. L. H.*

Pecan, The. By C. A. Reed (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 251; July 1912; plates).—An account of the Pecan tree (*Hicoria Pecan*), a nut which grows in the United States, both wild and planted

on farms. It is just now attracting great attention and being widely exploited there. Orchards are being rapidly planted, in many cases to be passed on afterwards to hopeful investors, and nurserymen cannot keep up with the demand for young stock.

The writer thinks that more caution might well be exercised in the matter. Many of the favourable calculations on which planters are relying are based on figures taken from single trees grown in exceptional circumstances, and would certainly not represent the results from average trees grown in numbers and in average conditions. It has been said also that the Pecan is subject to no diseases and no pests, whereas such immunity is probably due to the fact that it has hitherto been planted chiefly as single specimens or has been found in its native forest. No agricultural product is without its natural enemies and other obstacles that must be overcome. The Pecan is no exception to this rule, and there are already both insect pests and fungous diseases which are known to attack it.

The writer gives maps showing the natural distribution of the wild Pecan, describes its habit of growth, its cultural distribution; discusses its economic importance, and gives an account of methods of culture and propagation. The bulletin ends with a descriptive list of the best and best-known varieties which have arisen through selection and propagation by growers and nurserymen.—*M. L. H.*

Pelargonium Cultivation for Essential Oil. By Joseph Knight (*Jour. Dep. Agr. Vict.* Nov. 1912, pp. 677-680).—Plants cut when coming into bloom, mature foliage boiled slowly in still; the oil distils out. Five to six tons of leaves are produced from the acre, yielding about 3 lb. of oil from a ton of leaves. There may be a second or third cutting of leaves.—*C. H. H.*

Persimmons, Experiments on Processes of Rendering them Non-astringent. By H. C. Gore (*U.S.A. Dep. Agr., Bur. Chem., Bull.* 141; Sept. 29, 1911; plates).—The Oriental Persimmon was introduced into America from Japan about fifty years ago, but has never become as popular there as it deserves. When it was imported the process by which the Japanese remove the excessive astringency of the fruit without destroying its firmness was not imported with it. This bulletin tells of experiments, first in preparing the fruit in the time-honoured Japanese fashion—that is, of heading it up in an empty saké cask, the saké being of the best quality. This removes all astringency within a short time and leaves the fruit firm and sound, so that it may be pared and eaten like an apple. Later experiments were tried with the view of finding some chemical substance to take the place of the saké, and it has been found that carbon dioxide will answer the purpose, a little dry starch being placed in the receptacle during the operation to prevent the fruit cracking.

How soon this use of carbon dioxide treatment becomes general will depend more on the growers than on the dealers. In the writer's opinion they should see that it is perfected and advertised, until the

public realizes that it is no longer necessary to keep persimmons until they are pulpy and over-ripe before they are fit to eat; for until the persimmon can be pared and eaten without a spoon, it will never take the place in public estimation that it deserves. *M. L. H.*

Pests, destructive, insect and fungus, scheduled by the Board of Agriculture. By H. C. Long (*Gard. Chron.* Sept. 28, 1912, p. 241).—The 17 pests scheduled are dealt with in separate articles as follows:—

1912. Oct. 1.—Narcissus Fly. *Merodon equestris*.

Nov. 2.—Wart Disease of Potato.

Dec. 7.—American Gooseberry Mildew.

1913. Feb. 1.—San José Scale.

March 1.—Brown Tail Moth.

March 15.—Vine louse.

April 26.—Gipsy Moth.

May 3.—Potato Moth.

May 24.—Black Knot.

June 7.—Nun Moth.

Aug. 16.—Mediterranean Fruit Fly.

Sept. 6.—Cucumber Canker.

Sept. 13.—Large Larch Saw-fly.

Oct. 4.—The Colorado Beetle.

and are to be continued.—*E. A. B.*

Phrynium Lubbersii. By A. Heydt (*Gartenflora*, vol. lxi. pt. xviii. pp. 405–406).—*Phrynium Lubbersii* is a decorative house plant, of easy culture. It resembles *P. setosum*, but the leaves are pale yellow, with pale green markings.—*S. E. W.*

Platyelinis latifolia. By A. Heydt (*Orchis*, vol. vi. pt. vi. pp. 102–103).—Well grown in shallow pans, is very decorative, as the panicles are covered with sweet-smelling flowers.—*S. E. W.*

Piuns flexilis (*Bot. Mag.* tab. 8467).—W. North America. Family *Coniferae*, tribe *Abietineae*. Three, 40–80 feet high. Leaves in bundles of five. Cones ovoid, 3–4 inches long.—*G. H.*

Podocarpus, A New. By R. Pilger (*Not. König. Bot. Berlin*, vol. v. No. 50, p. 299; Jan. 1913).—Describes the characters of a new species of *Podocarpus*, for which the name *P. Roraimae* Pilger is proposed. It was discovered on Roraima at a height of about 1900 metres above sea. It is related to both *P. macrostachyus* and *P. oleifolius*, although easily distinguished from them.—*R. B.*

Poga oleosa Pierre. **An Oil-yielding Tree from Cameroon and Gaboon.** By A. Engler (*Not. König. Bot. Berlin*, vol. v. No. 50, pp. 294–298; Jan. 1913; 3 figs. in the text).—*Poga oleosa*, one of the Rhizophoraceae, was first discovered by the missionary P. Klaine at Libreville in West Africa. The tree reaches a height of 25–50

metres, and the smooth stem has a diameter of 2 metres. The fruit is a spherical stone-fruit, with a thin, fleshy exocarp, and a very thick, woody endocarp. One or two loculi of the quadrilocular fruit are usually sterile. The acotyledonous embryos are very rich in oil. The paper contains excellent figures of the chief characters of this tree, and illustrates the anatomy of the leaf—*R. B.*

Poinsettias, New: *P. pulcherrima alba* and *P. × salmonea* Adneti. By R. Adnet (*Rev. Hort.* May 16, 1913; pp. 227-8; coloured plate).—The plate represents two very attractive forms. *P. p. alba* is hardly correctly named, as the bracts are yellowish, suffused with light pink; those of the other are of a delicate rose-pink throughout.—*C. T. D.*

Poisonous Plants. By J. H. Maiden (*Agr. Gaz. N.S.W.* vol. xxiii. p. 604).—*Olearia viscidula* and *Vanilla* must be added to the list of plants which may irritate the skin.—*S. E. W.*

Pollenizers for Fruit (*Jour. Dep. Agr. Vict.* July 1912).—E. E. Pescott writes, p. 453, that 'Sturmer Pippin' is found to be one of the best pollenizers for 'Jonathan' apple, and E. Wallis writes (p. 505) that 'Keiffer' pear is successfully pollenized by 'Harrington's Victoria,' 'Howell,' and 'Le Conte,' also that 'Bailey's Bergamot' is well pollenized by 'Williams' Bon Chrétien'; spur pruning makes 'Winter Nélis' bear. 'Early Guigne' cherry is a very light cropper if isolated, but crops well with 'Black Bigarreau' and 'Early Lyons.' 'Coe's Golden Drop' plum is prone to barrenness; no definite results have so far been obtained by crossing, but 'Pond's Seedling' is thought to be likely to prove beneficial as a cross.—*C. H. H.*

Pomologists, Lives of Great. By E. A. Bunyard (*Gard. Chron.* June 14, July 26, Aug. 30, 1913, with portraits). These articles deal with J. B. van Mons, A. N. Duchesne, and O. de Serres.—*E. A. B.*

Potato Clubs, Boys'. By J. C. Hogenson, M.S.A. (*U.S.A. Exp. Stn., Utah, Circ.* 5; Feb. 1912).—Potato Clubs appear to be similar to Corn Clubs mentioned in a previous journal. The first part gives full details respecting choice of seed and cultivation. The second part gives particulars of the constitution of the Club, a copy of the membership card and the rules relating to entrants for the competition. A good feature is the scoring card (see p. 13) and an explanation of the same.

The circular will prove of interest to persons having allotment gardens or school gardens.

There is much valuable information in small compass.—*W. W.*

Potato Disease, Minimizing Loss caused by (*Jour. Bd. Agr.* vol. xix. No. 6, pp. 441-443).—An article dealing mainly with the precautions which should be taken to minimize the loss from disease when storing potatoes in clamps.—*A. S.*

Potato Growing in Ohio. By F. H. Ballou (*U.S.A. Exp. Stn. Ohio, Bull.* 218; June 1910; plates).—Potato culture in Ohio is rapidly developing into a vast industry. This bulletin discusses various questions which confront the grower, gives hints on planting and culture, and on spraying, and adds a classified list of varieties. The writer insists that much of the confusion into which growers fall among the hundreds of varieties offered by seedsmen, and many of the complaints made that old varieties are re-named and sent out as new, arise from the fact that there are several distinct types or families of potatoes. The hundreds of varieties of different origin may be classified in these several groups. There are many varieties of separate and distinct origin which follow a single type so closely as not to be readily distinguished from each other either by habit of growth or character of tuber, even by an expert potato specialist. The classification suggested by the writer reduces the groups to the least possible number, and is based principally upon similarity of tuber rather than upon similarity of plant. The groups he gives are:—The *Triumph* Group, *Early Market* Group, *Early Ohio* Group, *Early Rose* Group, *Green Mountain* Group, *Seneca Beauty* Group, *Rural New Yorker* Group, and he mentions a few varieties belonging to each.

Spraying for fungus diseases and insect pests is strongly advised, and directions are given for making Bordeaux mixture for this purpose.

When Bordeaux mixture is needed for different sprayings during the season, much time and inconvenience may be saved by making up a "stock solution" of copper sulphate, which solution will keep indefinitely without deterioration.

Use a good barrel; remove one of the heads and fill to within 6 or 8 inches of the top with water, measuring the water by gallons. Weigh out in a sack as many pounds of copper sulphate as the number of gallons of water in the barrel. Tie the sack with strong twine close down to the contents, leaving a loop through which a stick may be thrust. Suspend the sack in the water by resting the stick across the top of the barrel in such a way that the bag will be but partially submerged. When the contents of the sack are dissolved each gallon of water will contain one pound of copper sulphate. It is well slightly to stir the solution before measuring out a portion for use. When the Bordeaux mixture is to be used proceed thus:—

Pour four gallons of the stock solution into the spray barrel and add water until the barrel is half filled; this weakening is necessary before adding the lime, or a curdled mixture will result. Weigh out in a bucket 5 lb. of fresh hydrated lime (known as "builder's lime," "flour lime," "sack lime," &c.). Add water to it, stirring vigorously and pouring off the "milk of lime" or thin whitewash into a second vessel until all the lime is dissolved. Strain, dilute still further through a fine-meshed brass wire strainer into the dilute copper solution, churning vigorously as the lime is being added. A

clear bright blue mixture should result. Add to this mixture whatever poison it may be desired to use for the destruction of insects, and finish by filling the barrel with water.

Insecticides:—

1. *Arseniate of lead* used at the rate of 3 lb. per 50 gallons of spraying mixture.

2. *Arseniate of soda*.

Commercial white arsenic 2 lb.

Carbonate of soda 4 lb.

Boil in 1 gallon of water until a clear liquid is formed. Dilute this solution to 2 gallons. Use 1 quart of this to 50 gallons of spray mixture. If not used in Bordeaux mixture, add 5 lb. of lime to ensure against burning of foliage.

3. *Paris Green*.—This, used in Bordeaux mixture, will not injure foliage. Use 8 oz. Paris green to 50 gallons water.—*M. L. H.*

Prickly Pear, Destruction of. By G. P. Darnell-Smith (*Agr. Gaz. N.S.W.* vol. xxiv. pt. ii. p. 152).—Spraying with a 12 per cent. solution of copper sulphate, or inserting a crystal of this substance in the plant, destroys Prickly Pear.—*S. E. W.*

Prickly Pears. By J. H. Maiden (*Agr. Gaz. N.S.W.* vol. xxiv. pt. i. pp. 49-55; 1 coloured plate, 2 plates).—*Opuntia Ficus indica*, or Indian Fig, is a nearly spineless form, but the fruit is armed with spinules, which can be removed by immersion in hot water. It is not likely to be a pest, as cattle readily feed on it. Burbank's spineless Prickly Pear does not appear to differ from the plants grown in the Sydney Botanic Gardens.—*S. E. W.*

Primula Juliae (*Bot. Mag.* tab. 8468).—Transcaucasia. Family *Primulaceae*, tribe *Primuleae*. Herb, perennial. Leaves with blades, 1 inch long and broad. Corolla purple.—*G. H.*

Primula Wattii (*Bot. Mag.* tab. 8456).—Himalaya. Family *Primulaceae*, tribe *Primuleae*. Herb. Leaves 1 inch long. Scape 4 inches high. Corolla violet, with a white eye.—*G. H.*

Proteaceae. By A. Sandhofer (*Oestr. Gart. Zeit.* vol. viii. pt. ii. pp. 82-87; 1 fig.)—The Proteaceae are propagated by cuttings, budding, or from imported seed. The plants require good drainage and thrive in a compost of peat, loam, sand, and a little charcoal. The following are very decorative; *Banksia aemula*, yellowish-green flowers in March; *B. Cunninghami*, flowers in winter; *B. dryanoides*; *B. ericaefolia* bears long spikes of flowers; *B. grandis*; *B. integrifolia* can be raised from cuttings and is useful as scion for budding; *B. Solandri* is one of the best; *B. speciosa* is well known; *B. spinulosa* flowers from January to May.

Grevillea robusta, *G. Hilliana*, *G. longifolia*, *G. flexuosa* (easily raised from seed), *G. Preissei* or *Thelemanniana*, *Hakea acicularis* (bears white flowers in May), *H. elliptica* (has white flowers in July), *H. suaveolens*, *H. Victoria*, *Agnostus sinuatus*, *Protea*, *Rhopala corcovadensis* (*Roupala Pohlii*) are all worthy of cultivation. The last mentioned requires a warmer position than the others.—S. E. W.

Prunes. By W. J. Allen (*Agr. Gaz. N.S.W.* vol. xxiv. pt. iii. pp. 245-255; 8 figs.).—Prunes thrive in a well-drained loamy soil with plenty of lime and potash. They like moisture and sunshine. The surface soil must be kept loose and friable, and free from weeds. The following varieties are recommended: 'Prune d'Agen,' 'Robe de Sergeant,' 'Silver Prune,' 'German Prune,' 'Splendour,' 'Sugar,' 'Fellenburg,' and 'Golden Prune.' Prunes are attacked by San José scale, borers, fruit fly, red mite, aphid, and curculio. The last pest is destroyed by spraying with arseniate of lead just as the buds are opening and again when the petals are falling. Brown fruit rot and shot-hole are treated with Bordeaux mixture or lime and sulphur.—S. E. W.

Prunus pennsylvanica (*Bot. Mag.* tab. 8486).—North America. Family *Rosaceae*, tribe *Pruneae*. Tree, 30-40 feet high. Leaves 3-4 inches long. Flowers white, $\frac{1}{2}$ inch across.—G. H.

Prunus salicina Lindl. By E. Koehne (*Not. König. Bot. Berlin*, vol. v. No. 50, pp. 287-288; Jan. 1913).—The paper contains a discussion of the nomenclature of this species. The author finds *P. salicina* to be identical with *P. triflora*, but that the former name has priority.—R. B.

***Pyracantha crenulata* and its variety, *P. c. yunnanensis*.** By S. Mottet (*Rev. Hort.* May 1, 1913; 1 illustration and coloured plate).—Two new *Pyracanthas* highly recommended, *yunnanensis* bearing a heavy crop of deep orange-red berries, and of more robust habit.—C. T. D.

***Puya chilensis*.** By R. I. Lynch (*Gard. Chron.* July 5, 1913, p. 2; 3 figs.).—Flowering of *Puya chilensis* in open air at Cambridge.

E. A. B.

Pycnostachys Dawei (*Bot. Mag.* tab. 8450).—Uganda. Family *Labiatae*, tribe *Ocimoideae*. Herb, stems 4-6 feet high. Leaves narrow-lanceolate. Spikes 1-5 inches long. Corolla, deep blue, 3-4 inches long.—G. H.

Pyrus ioensis (*Bot. Mag.* tab. 8488).—Central United States. Family *Rosaceae*, tribe *Pomeae*. Tree, 20-30 feet high. Leaves 3-5 inches long. Flowers violet-scented, 2 inches across, in 4-7-flowered corymbs. Fruit fragrant, yellowish-brown, globose.—G. H.

Quack-grass, The Eradication of. By J. S. Cates (*U.S.A. Dep. Agr., Farm. Bull.* 464; Aug. 1911; 6 figs.).—*Agropyron repens* (twitch or couch grass) is prevalent in the North Central and North-Eastern States, and a number of closely allied species in the Rocky Mountains and the Pacific States. It is believed that the principles laid down in this bulletin apply equally well to all rootstock-producing species of the same genus.—A. P.

Radamaea (Bentham) and Nesogenes (A. de Candolle), On the Genera. By W. Botting Hemsley, F.R.S., F.L.S., V.M.H. (*Jour. Linn. Soc.* vol. xli. No. 282, pp. 311–316; July 1913; with 1 plate).—This paper gives an historical account of the discovery of several species of *Nesogenes* and a systematic description of their principal morphological features.

Radamaea prostrata (Bentham) is shown to be more correctly referred to the genus *Nesogenes*.

The genus *Nesogenes* is restricted to coral islands, or coral formation, in two very distant, relatively small areas within the southern tropic; the one in the Pacific Ocean with a median longitude of about 145° W.; the other in the Indian Ocean with a median longitude of about 60° E. It is not unlikely that intermediate stations may be discovered, but it is also possible that the present widely separated stations may have resulted from the disappearance of these plants from the intervening country owing to changes in the physical conditions of these parts.—R. B.

Raspberry and Loganberry, Diseases of (*Jour. Bd. Agr.* vol. xix. No. 2, pp. 124–126; plate).—The diseases caused by the two fungi *Hendersonia rubi*, Westendorp, and *Ascochyta pallor*, Berk., are described, and preventive measures are suggested.—A. S.

Remusatia, The Araceae-genus, in Cameroon. By A. Engler (*Not. König. Bot. Berlin*, vol. v. No. 50, pp. 300–301; Jan. 1913).—That genera and species of plants closely related to Indian ones have been found in tropical Africa, and especially in the mountainous regions in the east and central areas north of the Equator, is well known. Now, however, an Indian plant-type has been found in the wooded district of West Africa. This is *Remusatia*, found by C. Ledermann in 1909 in north-west Cameroon, growing as an epiphyte upon the fallen trunk of a forest giant. The nearest station to this from which *Remusatia vivipara* has been recorded is in the Himalayas west of Nepal. Although the hooks upon the adventitious buds of this plant enable these structures to cling to passing animals which can convey them over long distances, yet the distance between Cameroon and Himalaya is so great that we may assume that intermediate stations for this plant will yet be discovered.—R. B.

Rhizoctonia Diseases (*Jour. Bd. Agr.* vol. xx. No. 5, pp. 416–419; plate).—The diseases caused by *Rhizoctonia violacea*, Tul., and *R. solani*, Kühn, are described, and preventive and remedial measures are given.—A. S.

Rhododendron Augustinii (*Bot. Mag.* tab. 8497).—China. Family *Ericaceae*, tribe *Rhodoreae*. Shrub, $3\frac{1}{2}$ –5 feet high. Leaves lanceolate, $1\frac{1}{2}$ – $2\frac{1}{2}$ inches long. Corolla campanulate, lobes $2\frac{1}{2}$ inches across, pale rose above, white with yellow spots at the base of the tube.—*G. H.*

Rhododendron sublanceolatum (*Bot. Mag.* tab. 8478).—Japan. Family *Ericaceae*, tribe *Rhodoreae*. Shrub. Leaves narrow-elliptic or lanceolate, 1 – $2\frac{3}{4}$ inches long. Flowers terminal; corolla 2 inches long, crimson-scarlet.—*G. H.*

Rhododendron Wightii (*Bot. Mag.* tab. 8492).—Sikkim Himalaya. Family *Ericaceae*, tribe *Rhodoreae*. Shrub or small tree, Leaves $3\frac{1}{4}$ –8 inches long. Inflorescence many-flowered. Corolla campanulate, $1\frac{3}{4}$ inch long, straw-yellow, dotted with deep red.—*G. H.*

Rice, A Sclerotial Disease of. By F. J. F. Shaw (*Mem. Dep. Agr. India, Bot. Ser.* vi. p. 11–23; July 1913; plates).—The fungus *Sclerotium Oryzae* Catt. has already been found a troublesome parasite in Italy and Japan, and has now been recognized in India. The diseased shoots turn yellow and die, but tillering occurs, and this is probably the most marked symptom of the trouble. The small black sclerotia occur in the interior of the stem, while the hyphæ penetrate the walls of the cells and destroy the protoplasm. Cultures were made, but the ascigerous stage of the fungus was not obtained.—*F. J. C.*

Root Curvature and Unsymmetrical Growth in Thickness. By A. Ursprung (*Beih. Bot. Cent.* Bd. 29, Abt. 1, Heft 1, pp. 159–218; with 1 fig.).—The author found that, of 153 curvatures in roots of *Picea excelsa*, the resulting growth in thickness occurred in 148 cases on the concave side; in 155 out of 156 cases in roots of Beech, the growth in thickness was also on the concave side.

He discusses the connexion between such eccentric growth and the conditions of tension and pressure without arriving at definite conclusions. The increase in growth seems usually (but not always) to be assisted on the side subjected to pressure and hindered on that exposed to tension. The whole subject of the effect of mechanical stress and tension on growth is fully discussed, but reference must be made to the original for details and literature.

The author points out that, in the most different cases of eccentric growth in thickness, the cross-section becomes elliptic with the major axis in the plane of curvature, with the result that the power of resistance to bending is increased.—*G. F. S. E.*

Root Nodules, Royal Palm. By G. L. Fawcett (*U.S.A. Exp. Stn. Porto Rico, Ann. Rep.*, 1911; pp. 38–39).—In the root nodules of the royal palm of Porto Rico is found a fungus which resembles in some respects that described from the nodules of *Podocarpus chinensis*, which has been grown for several years with no other nitrogen than that derived from the air. Royal palms grown from disinfected seed

in sterilized soil developed nodules which contained no fungus, and these nodules contained no stored-up starchy or nitrogenous food material as in the case with those in which the fungus is present. Tests for proteolytic enzymes in the nodules have not yet been made. Since nodules are formed without the fungus, the real problem in growing in nitrogen-free cultures is to test the comparative ability of plants with fungus-bearing nodules and those with nodules lacking the fungus to thrive under such conditions. It is thought that the nodules are possibly air roots which possess the additional function of assisting the palm to secure a larger supply of nitrogenous food material.—*A. P.*

Rosa omeiensis (*Bot. Mag.* tab. 8471).—Western China. Family *Rosaceae*, tribe *Roseae*. Shrub, 3–10 feet high. Leaves $1\frac{1}{4}$ – $2\frac{1}{2}$ inches long, 9–13 foliolate. Flowers white, with usually 4 petals. Fruit ellipsoid, bright red.—*G. H.*

Rosa sertata (*Bot. Mag.* tab. 8473).—China. Family *Rosaceae*, tribe *Roseae*. Shrub, 3–7 feet high. Leaves $1\frac{3}{4}$ –4 inches long. Flowers rose or rose-purple, 2– $2\frac{1}{4}$ inches across.—*G. H.*

Rose Distillation for Scent. By Joseph Knight (*Jour. Dep. Agr. Vict.* Aug. 1912).—In the South of France some scent distilleries can handle 150 tons of roses a day. The petals are stripped from the calyx, boiled in a still for about two hours, within twenty-four hours of gathering; the distillate is Rose water. For perfume extraction rose petals are boiled in olive oil; after twenty-four hours the petals are drawn out and pressed; the same process is repeated with fresh petals until the oil is sufficiently impregnated with the scent of the flower, when it is stored, and the essence extracted by some highly rectified solvent. This enfleurage and maceration system is very popular in France, and a very considerable amount of pomade is made and used in this form.—*C. H. H.*

Rose ‘Madame Edouard Herriot.’ By G. T. Grignan (*Rev. Hort.* Nov. 1, 1912, p. 496; coloured plate).—This represents a very beautiful Rose of a deep rich salmon colour, finely double, and of good form, with attractive buds (‘Caroline Testout’ × ‘Soleil d’Or’). Very robust and hardy, with erect branches, raised by N. Perner Ducher. (The ‘Daily Mail’ Rose.)—*C. T. D.*

Rose Mildew (*Agr. Gaz. N.S.W.* p. 1042).—This disease is checked by dusting with flowers of sulphur mixed with one-third its volume of lime, or spraying with lime-sulphur, potassium sulphide, or 1 part of sulphuric acid in 1500 parts of water.—*S. E. W.*

Ruellia Harveyana (*Bot. Mag.* tab. 8485).—Mexico. Family, *Acanthaceae*, tribe *Ruellieae*. Herb, perennial. Stems slender. Leaves 2–3 inches long. Flowers, corolla pale lilac, 2 inches across.
G. H.

Ruscus, Danae, and Semele phylloclades. By Gustav Danek (*Beih. Bot. Cent.* Bd. 29, Abt. 1, Heft 3, pp. 357-408; 2 plates; 13 figs.).—The author finds that the nervation of *Ruscus*, *Danae*, and *Semele* phylloclades shows that these organs consist of two parts which are of different origin morphologically, and confirms Velenovsky's theory on the subject.

The leaf-like organs in the bract axils on *Danae* are true terminal leaves ending a short branch. The flower-bearing phylloclade of *Ruscus* consists of an axis which ends with a terminal inflorescence; one of the bracts of the first flower is very much enlarged and united to the axial part. The barren phylloclade of *Ruscus* is a terminal leaf.

Myrsiphyllum and *Asparagus* have true phylloclades—that is, these are caulome structures—but those of *Semele* are like those of *Ruscus*. The anatomy of these organs confirms these conclusions, as also do the abnormal cases described by the author in which the two original parts which go to form the phylloclade remained separate. Many transitional states were found by the author, of which some are figured.—G. F. S. E.

Salicornia, The Anatomy of the Genus. By Ethel De Fraine, D.Sc., F.L.S. (*Jour. Linn. Soc.* vol. xli. No. 282, pp. 317-348, July 1913; with 2 plates and 14 text figures).—The morphological distinction of leaf and stem has been variously interpreted by different authors who have studied the structure of these succulent inhabitants of the sea-shore. Babington, Bentham, and Hooker consider the plants to be leafless and regard the fleshy internodes as composed of succulent stem cortex. De Bary believed the leaves to be represented by the small free tips on the succulent stem which are decussately arranged. Duval-Joune regarded the so-called "outer cortex" of the stem as foliar in character.

Dr. De Fraine has reached the same conclusion as Duval-Joune and she bases this conclusion upon a careful consideration of:—

- (a) The development of the shoot behind the apex.
- (b) The anatomy and the course of the vascular bundles.
- (c) The structure of the flowering shoot.
- (d) The leaf-fall.
- (e) The morphology of the seedling.
- (f) The morphology of species of allied genera.

Besides this principal result of her research Dr. De Fraine also records a number of other interesting features in the histology and anatomy of *Salicornia*, such as the existence of transition forms between the spiral tracheids and stereids; the formation and character of the aerenchyma, &c.—R. B.

Salix zygostemon and S. Medemii var. longifrons. By J. Bornmueller (*Gartenflora*, vol. lxii. pt. xi. pp. 242-245).—*Salix zygostemon*, from the West of Persia, is perhaps a natural hybrid of

S. purpurea and *S. Medemii*. The young twigs have yellow bark, and the new leaves show silky hairs. A new variety of *S. Medemii* (*longifrons*), with long, narrow leaves, has been found in Persia.

S. E. W.

Sansevieria aethiopica (*Bot. Mag.* tab. 8487).—S. Africa. Family *Liliaceae*, tribe *Dracaeneae*. Under-shrub, succulent. Leaves 13–30, 5–16 inches long. Inflorescence 16–30 inches long. Perianth white, tube 1 inch long, lobes $\frac{3}{4}$ inch long, revolute.—G. H.

Saprophytes of Java, Contributions to our Knowledge of
By A. Ernst and C. Bernard (*Ann. Jard. Bot. Buit.* ser. ii. vol. xi. pt. ii. 1912).

X. A systematic description of *Burmannia coelestis* Don. By J. J. Smith. (Pp. 219–222; with 1 plate.)—A detailed description of the systematic characters and habitat of this plant. This species is usually described as an annual, but the author believes it to be perennial.

XI. External and internal morphology of *Burmannia coelestis* Don. By A. Ernst and C. Bernard. (Pp. 223–233; 1 plate.)—This species differs from those described by the authors in previous communications in being non-saprophytic, and in its tissues containing chlorophyll. Most of the morphological and anatomical features of *B. coelestis* are such as might be anticipated from its manner of life. It possesses a normal root system, although without root hairs. The adventitious and lateral roots contain a fungus, especially in the epidermal cells. The epidermis of the stem is furnished with stomata; its inner and outer cell-walls are thickened and its surface is covered by a well-marked cuticle. The stomata have no subsidiary cells.

The structure of the leaf of *B. coelestis* is in accordance with its function as an assimilatory organ, and in this respect differs essentially from the greatly reduced scale leaves of the saprophytic species.

XII. Developmental history of embryo sac, embryo, and endosperm of *Burmannia coelestis* Don. By A. Ernst and C. Bernard. (Pp. 234–257; with 4 plates.)—The archesporial cell becomes, without previous division, the embryo sac mother-cell, and this, as a rule, becomes directly the embryo sac itself. This species therefore forms the last link in the chain of reduction running through the family of Burmanniaceae as regards the tetrad-division.

The egg-cell and two synergidæ are formed at one extremity of the embryo sac and three antipodal cells, only slightly or not at all differentiated from one another, occupy the other end of the sac.

In *B. coelestis* the embryo and endosperm develops without previous fertilization, and in this respect resembles the apogamous species of *Alchemilla*, *Wikstroemia indica*, &c. It is peculiar,

however, in the frequent development of two or even three embryos from the cells of the egg-apparatus.

Embryo-formation precedes endosperm development in *B. coelestis*.

In place of the usual two polar nuclei, groups of three to five nuclei were met with in a few cases.

The fully-developed seed contains about thirty endosperm-cells.
R. B.

Sarcochilus unguiculatus L. By E. Miethe (*Orchis*, vol. vi. pt. vi. pp. 101-102; 1 plate).—This orchid, also known as *Thrix-spermum unguiculatum*, bears pale yellow flowers with purple streaks. It has no definite flowering period. The flower stem contains about 20 buds, not more than five of them open at the same time. This takes place in the early morning; by noon they have lost their strong perfume and soon fade away.—S. E. W.

Sarracenia Hybrids. By A. Hefka (*Oestr. Gart. Zeit.* vol. viii. pt. ii. pp. 42-43; 1 fig.).—*S. × Vogeliana* (*Courtii × Stevensi*) is a strong growing form resembling its parents. *S. Laschkei* (*Courtii × Mooreana*) is weaker in growth than *Mooreana*. *S. × Diesneriana* (*Courtii × flava*) is quite distinct from its parents, having leaves 12 inches long, greenish-yellow to brown in colour.—S. E. W.

Saxifraga Aizoon, cochlearis, and lingulata. By F. Mader (*Gard. Chron.* August 23, 1913, p. 134; 1 fig.).—Notes on these three species as found in the Maritime Alps.—E. A. B.

Saxifraga Aizoon, cochlearis, and lingulata. By R. Farrer (*Gard. Chron.* Sept. 27, 1913, p. 213).—Further note on the same species.
E. A. B.

Saxifraga Stribnyi (*Bot. Mag.* tab. 8496).—Bulgaria. Family *Saxifragaceae*, tribe *Saxifrageae*. Herb, tufted. Leaves rosulate, 1 inch long, fleshy, glaucous. Inflorescence cymose, 4 inches long. Flowers nodding, $\frac{1}{2}$ inch long; calyx reddish-purple; petals carmine.—G. H.

Schomburgkia. By R. Schlechter (*Orchis*, vol. vii. pt. iii. pp. 38-43).—The Schomburgkias are divided into two classes, *Eu-Schomburgkia* with short racemes and long bracts, and *Chauno-Schomburgkia* with short bracts and branching inflorescence.

The following varieties of *Eu-Schomburgkia* are in cultivation:

S. crispa Lindl., closely allied to *S. marginata*, and *S. undulata*, is a native of Guiana. The petals and sepals have a yellowish-brown colour, and the labellum is pale violet-pink. *S. Lyonsii* Lindl. is found in Jamaica and Cuba at 3000 feet above sea level. It has white flowers, marked with violet. *S. marginata* Lindl. is somewhat similar to *S. crispa*. The flowers are larger, the petals and sepals are brown, with paler edges, and the lip is white, with a touch of red at the tip. *S. rosea* Lindl. is a beautiful Orchid from the mountains

of Venezuela. The petals and sepals are deep red, but the bracts, stalk, and lips are pink. *S. undulata* is difficult to distinguish from *S. marginata*. It comes from New Granada, and is found at an altitude of 2200 feet. The petals and sepals are brown, and the labellum is violet red.

S. Wallisii occurs in New Granada and Peru about 4000 feet above the sea. The flowers are yellowish-brown, with white lips.

Chauno-Schomburgkia.—*S. Galeottiana* is a native of Mexico and Yucatan, and closely resembles *S. tibicinis*, but the flowers are brighter. *S. Humboldtii* is a large-flowering variety from Venezuela. *S. lepidissima* has a stem $3\frac{1}{2}$ feet long, with dark red flowers. *S. Sanderiana* is perhaps identical with the above variety. *S. tibicinis*, from Central America, has a long stem bearing panicles of large flowers. The petals and sepals are waved, brownish-red in colour, with white lips, and are edged with red. *S. Thomsoniana*, a native of the West Indies, has small yellow flowers and a red labellum. *S. campeacheana*, a native of Central America, is probably a natural hybrid of *S. undulata* and *S. Thomsoniana*. *Schombocattleya spiralis* is the only known hybrid obtained from the pollen of *Schomburgkia*.—S. E. W.

Schools of Agriculture and Domestic Economy in Wisconsin. By A. A. Johnson (U.S.A. Dep. Agr. Office of Exp. Stns., Bull. 242. 1 map, 5 plates).—An account of the Agricultural Trade Schools in Wisconsin. On page 6 we read "These schools . . . have for their sole object the educating of farmers' boys and girls who do not wish to take an extensive college course, but who are anxious to get that form of training which will be most useful to them when they take charge of the home farm or the farm home."

Each school is described and photographic illustrations are given. The curriculum is also stated.

Pages 19–24 give statistics relating to the cost of maintenance and number of students in attendance, together with the law relating to these schools.—W. W.

Seeds of Compositae and other Orders, Germination of the. By Hans Bocker (*Beih. Bot. Cent. Bd.* 29, Abt. 1, Heft 1, pp. 21–143; with 23 figs.).—In this paper, the author gives a very full account of experiments in the germination of fruits and seeds of those species in which there are two or more kinds of fruit and seed. But besides this, which is the main subject of his researches, there are many interesting observations regarding the differences in percentage germination in light and in darkness, and of seeds freed from the pericarp as compared with others in their natural state.

Some fifty-three plants were fully examined, of which those most interesting to horticulturists will probably be *Calendula*, *Catananche*, *Chrysanthemum*, *Galinsoga*, *Layia*, *Rhagadiolus*, *Sanvitalia*, and *Zinnia*.

Three Cruciferae and three Chenopodiaceae (*Atriplex* and *Oxyris*) were also examined.

The following table gives some results of the author's experiments :

	Date.	In Light.		In Darkness.	
		Disc Fruits. Per cent.	Ray Fruits. Per cent.	Disc Fruits. Per cent.	Ray Fruits. Per cent.
Dimorphotheca hybrida, seed partly freed of pericarp	Nov. 14 to Dec. 29	20	58	17	45
	Feb. 26 to April 8	81	84		
	Nov. 14 to Nov. 24	56	78		
Ditto wholly freed of pericarp	April 9 to May 9	93	92		
Gutierrezia gymnospermoides	April 9 to Oct. 19	41	25		
Heterotheca Lamarckii	Feb. 19, 1910 to Jan. 30, 1911	46	56	43	47
Buphthalmum salicifolium	Jan. 11, 1910 to Feb. 4, 1910	63	48 and 45	62	47 and 58
Zinnia elegans	Nov. 26, 1909 to Jan. 25, 1910	61	49	58	39
Ximenesia encelioides	Feb. 1 to Aug. 12	58	51		
Synedrella nodiflora	Nov. 9, 1910 to Jan. 30, 1911	58	35		
Layia elegans	"	88	74		
L. platyglossa	"	72	71		
L. heterotricha	Dec. 30, 1909 to Oct. 19, 1910	61	32	53	15
Chrysanthemum segetum	April 8 to May 10	67	62	70	70
grandiflorum	Jan. 20, 1910 to Jan. 30, 1911	59	5	31	1
C. coronarium	April 12 to May 18	93	100		
C. frutescens					
Hypochoeris glabra					

There are many other results of experiments mentioned in this paper which should prove of considerable value to those who are interested in the propagation of seed. Thus, in many cases, the removal of the pericarps greatly assisted germination, raising the percentage from 17 and 35 per cent. to 52 and 74 per cent. (central and marginal florets) with *Dimorphotheca*. Also, with *Chrysanthemum viscosum*, the effect of removal of the pericarp was to raise the percentage of germination of the marginal florets from 23 per cent. to 98 per cent. *Thrincia* and *Geropogon* showed similar results.

Treatment with nitric acid diminished the percentage of germination. In the case of *Dimorphotheca pluvialis*, 88 per cent. central and 51 per cent. marginal germinated in ordinary air, and 99 per cent. and 91 per cent. respectively in 100 per cent. Sauerstoff. In other experiments, however, with the same plant 100 per cent. germinated in ordinary air. An atmosphere of hydrogen diminished the percentage of germination in the same plant.

A curious result was obtained with seeds of *Catananche lutea*. In light 64 per cent. of the aerial and 80 per cent. of the subterranean

fruits germinated, whilst in darkness 84 per cent. of the aerial and 77 per cent. of the subterranean were found to do so.

Of *Zacintha verrucosa*, 96 per cent. of the central florets germinated and 94 per cent. of the marginal when the covering bract was removed, but only 18 per cent. when it was not removed.

Rhagadiolus stellatus has four different kinds of fruit, but 100 per cent. of each germinated.

With *Rapistrum rugosum* there are one large upper and a small lower seed in each fruit. Of the former 84 per cent. and of the latter only 46 per cent. germinated. Removal of the capsule wall increased the percentage of germination.

There are many other special results which might be mentioned, but unfortunately the author's results considered as general rules are extraordinarily conflicting, and even what has been given in this abstract cannot be taken as a guide to propagators.—G. F. S. E.

Seeds, Germination of Packeted. By Edgar Brown (U.S.A. Dep. Agr., Bur. Pl. Ind., Circ. 101; Sept. 16, 1912; tables).—In the interests of the small private grower some seed-testing experiments have been carried out and tables are here given showing the percentages of germination of:—

1. Seeds bought from retail merchants in coloured packets without grower's name.

2. Seeds ordered by post from a wholesale seedsman after consulting his catalogue.

In both these classes the percentage of live seed was lower than it should have been; in the case of the first, which are here called "box seeds," disgracefully so. In this case, the seeds being put up in showy packets and sold through local general merchants, no one's reputation is at stake, and there is no question of acquiring satisfied customers for any special firm.

It is asserted that the sale of packeted vegetable seeds will not be on a proper basis until each packet is labelled with the percentage of live seed which it contains.—M. L. H.

Senecios, New. By Kache (*Gartenflora*, vol. lxii. pt. viii. pp. 172–176; 2 plates).—*Senecio clivorum* occurs in Hupé (China) and in Japan. It forms a bush 3 feet high, with large round leaves, and bears a large number of yellow stellate flowers in July.

S. tanguticus, discovered in Hupé, is a rapid grower, attaining a height of 4½ feet. The large leaf is pinnatipartite. The yellow flowers are borne in panicles from the middle of August to September. This plant is best grown in groups, with plenty of space, as it spreads rapidly by means of underground runners.

S. Veitchianus, introduced from Hupé, is the most imposing in appearance of the family. The flower spikes, 6 feet high, are covered with golden blooms for weeks, from the beginning of July.

S. Wilsonianus resembles *S. Veitchianus*; the leaf is reniform, and the flowers yellow. These Senecios require plenty of nourishment and moisture, but need no protection in winter.—S. E. W.

Senecio stenocephalus (*Bot. Mag.* tab. 8472).—China and Japan. Family *Compositae*, tribe *Senecionidae*. Herb. Leaves radical, long-petioled; blade reniform, 9 inches long, 16 inch across, coarsely toothed. Racemes 14 inches long, $2\frac{3}{4}$ inches wide at base. Flowers yellow; from tip to tip of rays, $1\frac{1}{2}$ inch across.—*G. H.*

Sequoias, Giant. By L. Henry (*Rev. Hort.* Feb. 1, 1913; pp. 53-57; 1 illustration).—A very interesting article on the giant Sequoias (*Sequoia gigantea* Endl., syn. *Wellingtonia gigantea*) which attain a height of nearly 400 feet, a diameter of 50 feet, and a thickness of bark of 4 feet, and are estimated to be about 2000 years old.—*C. T. D.*

Shrubs in Wire Baskets. By H. Köhler (*Gartenflora*, vol. lxi. pt. xiii. pp. 285-287; 2 figs.).—In order to fill up gaps in the border, Roses, Pæonies, Buddleias, Ceanothus, and Fuchsias may be grown in wire baskets. They can be moved into the desired position even when they are in flower.—*S. E. W.*

Simarubaceae, Anatomy of. By Friedrich Boas (*Beih. Bot. Cent.* Bd. 29, Abt. 1, Heft 3, pp. 303-356; 8 figs.).—The author gives full details of the anatomy of 110 of the 189 species of this order. The Simarubineae are characterized by the presence of remarkable sclerenchymatous cells in the mesophyll, but there is no anatomical characteristic which is invariably found throughout the order. A new genus, *Hebonga*, is described, and new species of *Simaruba*, *Simaba*, *Castela Perriera* is placed under *Hannoa*.

Other changes in specific names on the ground of anatomical differences are also suggested.—*G. F. S. E.*

Smut in Wheat (*Agr. Gaz. N.S.W.* vol. xxiii. p. 394).—Corvusine is less effective as a bunt destroyer than treatment with a 2 per cent. copper sulphate solution and lime water; it also reduces the germinating power of the wheat to a greater extent.

Clarke's Carbolised Wheat Protector destroys smut, but affects germination to a greater extent than copper sulphate.—*S. E. W.*

Soil Biology. By G. L. Fawcett (*U.S.A. Exp. Stn., Porto Rico, Ann. Rep.* 1911; pp. 37, 38).—In the course of investigations into the bacteriology of "sick" soils it was found that in two of the worst soils in this respect there was a complete absence of protozoa, though bacteria were abundant. Though it was obvious that any good results to be derived from the disinfection of these soils cannot be due to the destruction of the protozoa, yet canes planted in boxes of the disinfected soil gave a much more vigorous growth than those planted in soils not disinfected.—*A. P.*

Soils, Effect of Strongly Calcareous, on the Growth and Composition of Plants. By P. L. Gile (*U.S.A. Exp. Stn., Porto Rico, Ann. Rep.* 1911; pp. 20, 22).—Investigations are in progress to determine the adaptability of various plants to such soils. Excess or

lack of lime is a predominant chemical feature of Porto Rican soils, so that sugar cane and pineapples become chlorotic in the former case and many plants suffer from soil acidity in the latter. The growth of rice appears to be much depressed by excess of lime in the soil, and other plants that become chlorotic under these conditions are being studied with a view to the confirmation of the theory that chlorosis is due to disturbance in the mineral nutrition of the plants caused by the large amount of calcium carbonate in the soil.—*A. P.*

Soy Beans, Varieties in Bengal, &c. By E. J. Woodhouse and C. S. Taylor (*Mem. Dep. Agr. India, Bot. Ser.* vol. v. pp. 103-176; March 1913; plates).—An account of the varieties of this important bean, found in Bengal, Bihar, and Orissa, with notes on their composition. Six types and three sub-types are described. The cultivation of the soy bean has not reached any magnitude so far in northern India, but the authors consider the difficulties in the way of its increased production by no means insurmountable.—*F. J. C.*

Spraying (*Agr. Gaz. N.S.W.* vol. xxiv. pt. ii. p. 151).—Large numbers of apple trees have been destroyed by injudicious spraying with red oil emulsion.—*S. E. W.*

Sterilization, Partial, of Soil for Glasshouse Work. By E. J. Russell and F. R. Petherbridge (*Jour. Bd. Agr.* vol. xix. No. 10 pp. 809-827; 9 figs.).—The results are given of a number of experiments carried out in continuation of the work described in the *Jour. Bd. Agr.* vol. xviii. No. 10, 1912.

In addition to the action of steam and dry heat on tomato-sick soil, that of a large number of antiseptics has been investigated. These belong to six groups, viz.: (1) volatile hydrocarbons; (2) heavy hydrocarbons; (3) tar acids; (4) tar bases; (5) formaldehyde; (6) inorganic antiseptics. "Some objections may be found to all the substances in these groups. We have not yet met the ideal combination of qualities in any one substance, and the grower's choice must be determined by three considerations—effectiveness, convenience, and price." The best, so far, would appear to be formaldehyde. It is interesting to note that an experiment arranged to see if anything would be gained by raising plants in soil heated to 130° F. (on which retardation of early growth does not set in), and afterwards potting them into steamed soil, failed, because, on the particular lot of steamed soil no retardation appeared, but on the contrary acceleration of seedling growth.

An experiment with cucumbers was carried out in a house belonging to a market grower with the object of comparing old rejected "sick" soil, both steamed and untreated, with virgin soil. Steamed virgin soil gave the best results, and untreated old sick soil the poorest. Old sick soil sterilized behaved very much like virgin soil unsterilized.

As the result of an experiment on pot vines it would appear that partial sterilization is the proper method of dealing with vine-sick

soils. Incidentally it is shown that soil which has never grown vines may be vine-sick.

The authors extended their experiments with *Chrysanthemums*, the results being practically invariably in favour of partial sterilization, though the different varieties were not unanimous in their choice of the sterilizing agent.—A. S.

Stocks, Summer 'Excelsior.' By F. Bloc (*Rev. Hort.* July 16, 1912; p. 328; 1 illustration and coloured plate).—The plate represents two very fine forms, one a rich magenta with lighter margins, and the other rich mauve with lighter margins, and very large, well-made flowers.—C. T. D.

Strongylodon pseudolucidus (*Bot. Mag.* tab. 8494).—Madagascar. Family *Leguminosae*, tribe *Phaseoleae*. Climbing shrub. Leaves 3-foliolate, 5 inches long. Raceme 5 inches long, 3-flowered at each node. Flower $1\frac{1}{2}$ inch long, crimson.—G. H.

Stumps, Blowing with Dynamite. By George Roberts (*U.S.A. Exp. Stn., Kentucky, Bull.* 154; June 1911; plates).—There are in various parts of Kentucky areas of considerable extent which are still "in the stumps." This is of course a state of things inconvenient for the use of agricultural machinery and wasteful in space. Stumps are sometimes burned, sometimes pulled, sometimes left to rot, but all these courses have their drawbacks, and the writer shows by the results of actual experiment that the cheapest and quickest method of removing them is by the use of dynamite.—M. L. H.

Sugar Cane, The Chlorosis of. By P. L. Gile (*U.S.A. Exp. Stn., Porto Rico, Ann. Rep.* 1911; pp. 20, 21).—The bleached cane seems to be confined to patches of very calcareous soil, no cases having occurred in the acid red clays, but green cane has been observed on patches of soil containing as much carbonate of lime as the soil growing chlorotic cane. The leaves of a few high stools in the midst of a strongly affected patch were brushed with a solution of ferrous sulphate and after a few days the leaves became much greener. After several applications of the solution these leaves were killed, but perfectly normal green leaves started out from the top of the canes. Further experiments, both in spraying and in applying iron to the soil, are in progress.—A. P.

Sweet Peas, American and Telemly. By A. Trebst (*Gartenflora*, vol. lxi. pt. xvii. pp. 378–381).—The Telemly sweet pea from Algiers begins to flower in March. The dark red varieties are specially valuable, as the American *L. odoratus praecox* does not yield these colours. Unfortunately the Telemly sorts do not come true from seed, whereas about 90 per cent. of the American do. To ensure a continuation of flowers, podding must be absolutely prevented.

S. E. W.

Sweet Pea, Diseases of. By J. J. Taubenhause and T. F. Manns (*Gard. Chron.* July 12, 1913, pp. 21–25; with 12 figs.).—Descriptions

of the appearance of affected plants in America, and of experiments to discover the identity of the organisms responsible.

1. *Mosaic Disease* can be induced by punctures with a needle infected by diseased tissues. Apparently spread by means of green aphids. Organism unrecognized.

2. *Root Rot*.—*Thielavia basicola* placed on healthy roots in sterile soil produces root disease, but it does not work up stems for more than 3 inches, and therefore is thought to be distinct from the cause of streak.

3. *Root Rot*.—*Rhizoctonia* or *Corticium vagum* differs from the following in its browning effects and frequently quite destroying the roots; also in Tomato, Lettuce, and Tobacco.

4. *Stem or Collar Rot*.—*Sclerotinia Libertiana* affects seedlings, attacking the collar. A soil organism affecting clover and introduced with animal manure.

5. *Root Rots*.—*Fusarium* species not yet identified. Seedlings affected suddenly collapse; the central woody region of roots easily pulls out from bark.

6. *Root Galls* due to the eel-worm, *Heterodera radiculicola*.—A common greenhouse trouble. Affect many other plants; form galls smaller and longer than the normal root nodules.

7. *Bud Drop*.—Due to too highly nitrogenous food. Application of phosphoric acid and sulphate of potash cured within a week.

8. *Anthracnose*.—*Glomerella rufo-maculans* also causes bitter rot of Apple. May attack seedlings; spreads rapidly in the field; can be carried to Peas from Apple.

9. *Powdery Mildew*.—*Erysiphe polygoni*, according to Massee, so far not identified in America. Occurs in greenhouse and on low wet land.—E. A. B.

Sweet Pea : Streak in Sweet Peas and Clover. By T. F. Manns and J. J. Taubenhaus (*Gard. Chron.* April 5, 1913, p. 216).—Describes experiments resulting in the isolation of, and successful cross-inoculation with, a new species of *Bacillus* named *B. lathyri* by the authors, and considered by them the cause of Streak disease in Sweet Peas.

E. A. B.

Sweet Peas, Winter-flowering. By P. Schmidt (*Oestr. Gart. Zeit.* vol. vii. pt. xi. pp. 425–428).—Sow the seed of *Lathyrus odoratus praecox* in boxes in the middle of July, transfer the seedlings in the middle of August to the border in the greenhouse, enriching the soil with well-decayed cow-dung. The temperature of the house should not exceed 55° F. The flowers will be ready for cutting at Christmas. The best varieties are: 'Christmas Meteor,' scarlet; 'Christmas Pink,' white and pink; 'Flamingo,' scarlet; 'Florenze Denzer,' pure white, one of the best; 'Greenbrook,' white, with lavender edge; 'Le Marquis' and 'Mrs. C. H. Totty,' blue; 'Mrs. Dolansky' and 'Mrs. Will. Sim,'

salmon; 'Mrs. W. Smalley,' pink; 'Mrs. E. Wild,' carmine; 'Mrs. A. Wallace,' pink, changing to lavender.—S. E. W.

Sweet Potato, Dry Rot. By L. L. Harter and E. C. Field (*Phytopathology*, ii. p. 121; June 1912; figs.).—The dry rot of the sweet potato has been already described and attributed to *Phoma batatae*; the authors show that this fungus has another and higher form in *Diaporthe batatatis*.—F. J. C.

Tabaschir and the Greek Saccharon. By Dr. Carl Curt Hosseius (*Beih. Bot. Cent. Bd.* 30, Abt. 2, Heft 1, pp. 88–109).—The author, after a critical study of the question, concludes that tabaschir is the solid siliceous material found within the stems of various Bambuseae. It occurs in commerce either as crude or calcined tabaschir. He holds that Tschirch's Tabaschir I. does not exist, and denies this author's explanation as to its origin. It is used as food in India, not as medicine. Bamboo manna contains no mannite, and should be described as Bamboo sugar. It is probable that Bamboo sugar is produced by external causes, *e.g.* insect injury. Water is sometimes found in Bamboo stems, which in Siam is due to the soil. The Greek σάκχαρον was simply cane sugar and its products, including the officinal sugar-candy.

The pieces of bamboo in candied sugar were simply used instead of threads during the process of manufacture.—G. F. S. E.

Timber, Increasing the Durability of (*Jour. Bd. Agr.* vol. xx. No. 4, pp. 307–310).—The question of the cost of creosoted as compared with that of untreated timber, and the relative value of the process in its application to timber of various kinds, is dealt with.
A. S.

Tobacco, British-grown. By R. Ellis (*Jour. Bd. Agr.* vol. xix. No. 11, pp. 904–908).—A brief history of tobacco-growing in Britain from its first introduction until the autumn of 1912.—A. S.

Tobacco, Cultivation of, for Preparation of Fruit and Hop Washes (*Jour. Bd. Agr.* vol. xix. No. 12, pp. 985–994).—A compilation of general information for the guidance of any growers who may contemplate the growth of tobacco, with a view to the preparation of fruit or hop washes for their own gardens or orchards. The recommendations made are largely based on the results obtained in experiments conducted at Wye College, in Kent, during the seasons 1910–1911.—A. S.

Tobacco, Culture of, in Ohio (*U.S.A. Agr. Exp. Stn., Ohio, Bull.* 238; March 1912; plates).—An account of the tobacco crop in Ohio, with tables and shaded maps showing the comparative quantities of the different types of tobacco grown in different districts in the State.

The various cultural and curing methods in use in the different

centres are described, and a history and description given of each variety of tobacco grown in Ohio.—*M. L. H.*

Tobaccos of the United States. By E. H. Mathewson (*U.S.A. Dep. Agr., Bur. Pl. Ind., Bull.* 244; Nov. 23, 1912; plates and maps).—A full description and statistical account of the tobacco crop all over the United States. The bulletin is written more from the point of view of the trader and Revenue Department than of the agriculturist, but it describes every strain of tobacco grown in North America, all the different methods of curing and preparing the leaf for market which produce the different brands, with an explanation of and a suggested origin for the trade names borne by the crop in every stage of its growth. The introduction gives a general history of tobacco-growing in America, and refers to the various alterations and vicissitudes which the export trade has undergone through the policy of Great Britain in the early Colonial days, through over-production, through wars at home and abroad, and through European complications.

Tables are then given of the yearly output of each State, and the crop is analysed into wrapper, leaf-binder, filler plug tobacco, chewing tobacco, &c., this part of the subject being illustrated by large folding maps coloured in different shades to show the dominant type of tobacco grown in each district.

There are many illustrations of the leaf in all stages of preparation, of growing and harvesting operations, and of the various styles of building and appliances used in the different centres.—*M. L. H.*

Transpiration and Varying Density of Solution. By George Bonyoncos (*Beih. Bot. Cent.* Bd. 29, Abt. 1, Heft 1, pp. 1–20; with 3 figs.).—The author grew wheat seedlings both in water and in sand and soil cultures, and used the following varying concentrations of a complete nutrient solution:—93·5, 187·5, 375, 750, 2250, 4500 parts per million.

He found that in all cases both the rate of growth and grams of dry matter produced (after the first four or five days) increased with increase in density of the solution. The transpiration of the seedlings is certainly affected by the degree of density of the nutrient solution. The number of transpirations required for every gram of dry matter formed increased with the density from 0 to from 93·5 to 375 parts per million, but then decreased.

The author suggests that the osmotic strength of the cell-sap increases with the density of the solution, and tested this theory by extracting the cell-sap and examining its osmotic strength by the electrical resistance as found by means of the Wheatstone bridge and by determination of the freezing-point.

He found a greater concentration of the cell-sap with an increase in density of the solution.

Dilute solutions stimulate transpiration. The actual dry matter produced was largest in the plants grown in solutions, and larger in

the sand than in the soil cultures; but relative transpiration was greatest in soil cultures, and less in solutions than in sand cultures.

G. F. S. E.

Trees for Parks and Gardens. By G. Heick (*Gartenflora*, vol. lxii. pt. viii. pp. 176-180).—*Juniperus communis*, *Ilex Aquifolium*, and *Euonymus europaeus* are recommended for a place in the park and garden.—S. E. W.

Tropaeolum Hybrids. By H. Fischer (*Gartenflora*, vol. lxii., pt. xii. pp. 278-282; 1 plate).—The seed of *Tropaeolum pinnatum* (a hybrid of *T. minus* and *T. peregrinum*) yields two types of flowers, viz. *bimaculatum* with red markings and *luteum*, as well as some dwarf forms. The hybrids produce masses of flowers, but very little seed. They can easily be increased from cuttings. The fertility of these plants can be increased by increasing the amount of carbonic acid in the atmosphere in which they are grown.—S. E. W.

Umbelliferae, Mechanical System of. By George Funk (*Beih. Bot. Cent. Bd.* 29, Abt. 1, Heft, 2, pt. 219-297; 5 plates).—The author describes in full detail the general system of mechanical support in the leaf and stem of this Family. He shows how the various cell-forms are connected, and explains the location of the mechanical tissues. The degree of dorsiventrality to be found in the rays of the umbels shows much variation. He thinks that the cause of dorsiventral structure is to be found in the effect of light and gravity.

In *Daucus*, *Oenanthe*, and *Chaerophyllum*, only one side of the main stem shows woody thickening of the subepidermal collenchyma, which is analogous to the tension and pressure sides (due to storm) of the outside trees in a fir plantation. The author examined also the differences in mechanical structure found in individuals grown in different habitats and of the various species of one genus. He finds a competition for the outside situation (under the epidermis) between the assimilatory and the strengthening tissue, both of which try to extend as widely as possible in this situation, and discusses the degree in which this is influenced by the environment.

He also describes the development of mechanical tissue in the stem and leaves. So long as the stem is in growth, the peripheral strengthening tissue consists of collenchyma. It is only when the fruit is nearly ripe that the final mechanical-strengthening system is attained.—G. F. S. E.

Varieties, Renaming of. By Philippe Revoire (*Rev. Hort.* Aug. 1, 1912; pp. 349-50).—A strong protest against the renaming, as if of new varieties, of already well-known ones, particularly in America, where, for instance, a long-established (twenty years) and well-known rose, 'Antoine Revoire,' of French origin, has recently been put forward as a novelty under the name of 'Mrs. William Taft,' while another, 'Leuchtfeuer,' has appeared as 'Mrs. Taft's Rose,' while several other

instances of similar character are quoted, involving injustice both to the raisers and the horticultural public.—C. T. D.

Vine, Black Spot. By M. Blunno (*Agr. Gaz. N.S.W.* vol. xxiii. pp. 449, 450).—A winter dressing against black spot of the vine is prepared by adding $\frac{3}{4}$ of a pint of pure sulphuric acid to a gallon of water. Apply to the stems before the buds begin to open. Spraying with Bordeaux mixture in spring and early summer is advisable.

S. E. W.

Vines. By M. Blunno (*Agr. Gaz. N.S.W.* vol. xxiv. pp. 331–339; 22 plates).—Illustrations are given of six ways of pruning vines.—S. E. W.

Vines. By M. Blunno (*Agr. Gaz. N.S.W.* vol. xxiv. pt. i. pp. 61–71, 6 figs.).—In Australia a vineyard is planted with cuttings or rooted cuttings. The cuttings may carry eight or ten buds, and are planted about 14 inches deep and 7 feet apart. Imported cuttings are placed in cold water for six hours and are then immersed for twelve hours in a solution of soft soap (10 lbs.), potassium sulpho-carbonate, 32° Beaume (3 gallons), in 100 gallons of water. To induce the cuttings to make roots, the bark of the lower end of the cutting is scarified with a curry-comb, so as to uncover the cambium.—S. E. W.

Vines, Budding. By M. Blunno (*Agr. Gaz. N.S.W.* vol. xxiii. pp. 617–624; 9 figs.).—The operation of budding the vine is shown in nine illustrations.—S. E. W.

Water Weeds, Destruction of (*Jour. Bd. Agr.* vol. xix. No. 3, pp. 216–218).—The use of copper sulphate for the destruction of algæ in ponds is described.—A. S.

Weed Seeds, The Destruction and Dispersal of, by Wild Birds. By W. E. Collinge (*Jour. Bd. Agr.* vol. xx. No. 1, pp. 15–26).—A summary of a large number of experiments is given, and the author is led to the conclusion that, although many writers have said that seed-eating birds are as a class beneficial, they really are not, seeing that, to a much greater extent than is generally supposed, they act as distributors of the seeds of weeds.—A. S.


Wood Pigeons. By R. S. MacDougall (*Jour. Bd. Agr.* vol. xx., No. 6, pp. 510–513).—The appearance and habits of the Wood Pigeon (*Columba palumbus*) and the Stock Dove (*Columba aenas*) are described, and methods of reducing their numbers in localities where they are troublesome are given.—A. S.

Woody Aster. By S. K. Loy (*U.S.A. Exp. Stn., Wyoming, Ann. Rep.* 1911–12; pp. 58, 59).—The poisonous principle of the plant has not as yet been worked out and seems to defy the ordinary methods of extraction (p. 29). Salicylic acid has been found to be present in the plant to the extent of 4 per cent., and the author thinks that this,

together with the high percentage of alkali metals, would be sufficient to cause death to a sheep eating of the plant to any extent.—*A. P.*

Xylobium. By R. Schlechter (*Orchis*, vol. vii. pt. ii. pp. 21-24).—The author gives a list of the varieties of *Xylobium* in cultivation: *X. brachypus*, from Nicaragua, has pear-shaped pseudo-bulbs; the flowers are somewhat larger than those of *X. squalens*. *X. brachystachum*, a native of St. Catharina, in South Brazil, is little known. *X. bractescens*, a Peruvian Orchid, bears yellow flowers with a red-brown lip. *X. Buchtienianum* has a flower stem 19 inches in height with 12 flowers. The colour is not known. The plant comes from Peru. *X. Colleyi*, from the West Indies, bears 3-5 red-brown flowers with purple spots. *X. coelia*, Rolfe, is a native of Columbia, resembling *X. squalens*. *X. concavum*, from Guatemala, has pale yellow flowers, smaller than *X. bractescens*. *X. corrugatum*, from Venezuela; the flower stem is about 5 inches high, bearing 3-7 brownish-purple blooms. *X. elongatum* is characterized by long cylindrical pseudo-bulbs. It bears from 10 to 20 pale yellow flowers with dark red labellum, and is a native of Central America. *X. foveatum* resembles *X. squalens*, but the flowers are straw-coloured. *X. hyacinthinum* is found in Venezuela, bears twenty pale yellow flowers which smell like hyacinths. *X. hypocritum*, Rolfe, is closely allied to *X. pallidiflorum*. *X. leontoglossum* is a strong grower from Columbia. *X. miliaceum* is a native of Bolivia. *X. palmifolium* has white or yellowish unspotted flowers (West Indies). *X. pallidiflorum*, a native of Venezuela, bears yellowish-white flowers. The flowers of *X. rebellis* are brown-red with brown spots. *X. scabrilingue* is recognized by its dark brownish-yellow flowers. The lip is covered with papillæ at the tip. *X. squalens* is a native of Venezuela. *X. stachyobiorum* occurs in Costa Rica. It has long, oval pseudo-bulbs. *X. supinum*, from Peru, is identical with *X. squalens* according to some botanists. *X. truxillense* resembles *X. scabrilingue* and *X. supinum*. Little is known about *X. undulatum*, a native of Peru.—*S. E. W.*

Zygadenus intermedius. By F. W. Heyl, F. E. Hepner, and S. K. Loy (*U.S.A. Exp. Stn., Wyoming, Ann. Rep.* 1911-12; pp. 51-57; 2 figs.).—From the crude alkaloidal mixture obtained from the leaves of this poisonous plant (known as Death Camas), a crystalline alkaloid has been isolated which has been named Zygadenine. This substance melts sharply at 200°-201° C. and gave analytical results which correspond to the formula $C_{39}H_{62}NO_{10}$.—*A. P.*

A black and white photograph of two tulip flower buds on long, slender stems. The buds are in various stages of opening, showing the layered petals. The stems are dark and contrast against a light, textured background.

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EXTRACTS FROM THE PROCEEDINGS

OF THE

ROYAL HORTICULTURAL SOCIETY.

GENERAL MEETING.

MAY 14, 1913.

F.-M. Lord GRENFELL, G.C.B., G.C.M.G., in the Chair.

Fellows elected (181).—W. C. Abbott, Mrs. T. Aikman, Miss Aird, L. J. Baggott, Mrs. F. H. Barker, F. O. Bates, A. H. Berly, F. W. Bird, Mrs. Birkbeck, Mrs. H. A. Birkbeck, G. Rowland Blades, Miss Blankley, Mrs. O. Boulton, Mrs. W. Bourne, Miss E. Budgett, Mrs. E. H. Burkitt, Mrs. A. Burton, Mrs. P. Butler, H. F. J. Cantley, Miss M. Carr, G. F. Cattell, D. Citroen, Miss G. Clarke, Mrs. N. L. Cohen, Mrs. E. H. Collins, E. P. Cooke, L. J. F. Cooper, W. P. Crake, Cicely Countess of Cranbrook, J. Crouch, Mrs. J. B. Cullen, Mrs. Dambergi, Mrs. E. T. Daniel, Miss M. A. Deacon, Miss C. Delmege, Miss M. Dence, Mrs. Dickson, Mrs. H. L. Dinwiddy, Max Dittrich, R. S. Donkin, Lady Downes, Mrs. D. Drew, L. F. Dunnett, Mrs. A. J. Edmondson, G. A. Elliott, Mrs. A. E. English, Mrs. G. Eumorfopoulos, J. Goodhart Evans, Mrs. T. Farries, Dr. T. Farthing, F. J. Forster, W. A. Frost, Mrs. Bruce Gardyne, Miss K. C. Garrick, H. E. Gates, Miss J. Gething, Mrs. D. Glennie, H. Goodman, A. Gosheron, F. A. Govett, Mrs. T. A. Greene, E. Guile, B. Gundelfinger, Miss Guttères, Mrs. H. M. Hales, Rev. C. B. Hall, Mrs. W. G. Hall, E. P. Hallows, G. Halsey, Lady Marjorie D. Hamilton, Mrs. Hands, A. Harley, Lady Lilian Harmsworth, J. Harris, J. Hewitt, S. G. Higgins, A. C. Hill, Lieut.-General Sir James Hills-Johnes, V.C., G.C.B., R. Hirst, Mrs. Hobman, Miss M. B. Hooper, Mrs. R. Horwitz, A. H. Howard, H. B. Hudson, Lady Hyde, T. Johnson, Mrs. Ridge-Jones, F. W. Kent, H. D. Kimber, T. Kime, H. G. Kingham, A. D. Lammin, Mrs. R. D. M. Lang, Mrs. Laverton, W. R. Lee, Mrs. J. D. Lees, Miss Legge, A. Lighton, Mrs. McDiarmid, Mrs. D. MacGregor, Miss M. J. C. McLaughlin, Mrs. Cecil Mangles, Mrs. F. Mangles, P. E. Marshall, Surg.-Gen. A. W. May, C.B., R.N., Mrs. A. Meredith, E. M. Micholls, M.A., Mrs. Miller, Mrs. A. Mitchison, Miss E. Molyneux, Mrs. A. Moore, E. Morse, F. Mortimer, Mrs. D. Moseley, Mrs. J. Muir, G. H. Neame, Col. A. C. Nicholson, E. B. Nix, J. Noaks, Lord Northbourne, Mrs. R. H. Otter, Dr. H. B. Overy, P. W. Owen, G. Pate, Mrs. G. W. Paton, Mrs. C. H. Pearson, C. E. Pierson, T. Ponsonby, Mrs. R. Hart

Prance, G. H. Pritchard, W. E. Rendle, Mrs. Reynard, Miss Richards, Mrs. T. Richards, Miss C. G. Robson, Miss E. Robson, Miss T. Rodber-Horton, Miss Rommel, Dr. O. Rosenheim, Lord Rowallan, A. Saalfeld, Lord St. Davids, Mrs. D. Sampson, C. A. Samuells, Miss W. G. Scarth, Miss C. Sheppard, Mrs. F. F. Sheppee, Lieut.-Col. W. A. Simmonds, Mrs. Slazenger, Rev. H. G. Southcomb, M. Standring, L. Sterne, M. Stevens, Miss Stevenson, Mrs. C. L. Sutherland, Mrs. J. F. Swinford, Mrs. F. J. Synge, Ratan Tata, G. N. Thomson, R. T. Thornton, Mrs. Tothill, Mrs. A. A. Trinder, Mrs. J. S. Turner, S. C. Turner, Miss B. E. W. Waite, Miss I. Walker, F. C. Wall, Mrs. Warde-Aldam, Mrs. Cecil Ward, W. W. Warner, Miss E. F. Warren, Miss E. M. Wenn, J. B. West, Dr. C. P. White, E. White, Mrs. F. W. Whiting, Miss A. Williams, D. T. Willis, Mrs. J. Sladen Wing, Miss L. A. Winter, Rev. D. Woodroffe.

Fellows resident abroad (2).—Léon Houry (France), Ernest W. Morse (Gold Coast).

Associates (5).—H. Cook, H. Drew, Miss E. F. Faulkner, Mrs. von Leth, Miss A. B. Webb.

Societies affiliated (3).—Ealing Tenants' Horticultural Society, N.S.W. Horticultural Association, Port Chalmers Horticultural Society.

A lecture on "The Coco-nut Palm" was given by Sir Everard im Thurn, K.C.M.G. (See p. 324.)

CHELSEA SHOW.

MAY 20, 21, AND 22, 1913.

JUDGES.

ORCHIDS.

Including Davidson Cup.

Bolton, W. W.

Crawshay, de Barri

Fowler, J. Gurney

ROSES.

Jennings, John

Orpen, O. G.

Page Roberts, Rev. F.

Mease, W.

CARNATIONS.

Barnes, N. F.

Blick, C.

Turner, Arthur

TULIPS.

Hall, A. D.

Jacob, Rev. J.

Ware, W. T.

BEGONIAS.

MacLeod, J. F.

Chapman, A.

Odell, J. W.

FRUIT AND VEGETABLES.

Challis, T., V.M.H.

Bunyard, G., V.M.H.

Poupart, W.

Rollit, Sir Albert K., LL.D.

GROUPS IN THE OPEN AIR.

Crump, W., V.M.H.

Fielder, C. R., V.M.H.

Thomson, D. W.

HARDY HERBACEOUS PLANTS.

Groups on the Ground :—

Lynch, R. Irwin, V.M.H.

Beckett, E., V.M.H.

Cheal, Joseph

Table Groups :—

- { Boscawen, Rev. A. T.
- { Paul, Geo., V.M.H.
- { Hales, W.
- { Veitch, P. C. M.
- { Notcutt, R. C.
- { Turner, T. W.

ROCK AND ALPINE GARDENS.

Outside :—

- Bowles, E. A., M.A.
- Grandfield, J.
- Knowles, P. O.

In Tent, and Farrer Cup :—

- Bilney, W. A., J.P.
- Clutton Brock, A.
- Crisp, Bernard

FOLIAGE PLANTS.

- Bain, W.
- Hudson, J., V.M.H.
- Baker, W. G.

OTHER FLOWERING PLANTS.

- Howe, W.
- Reynolds, G.

MISCELLANEOUS.

- Davis, J.
- Dixon, C.

HORTICULTURAL SUNDRIES.

To Exhibits :—

- Hooper, H.
- Pearson, A. H., J.P.
- Boscawen, Hon. John

To Subjects :—

- Chittenden, F. J., F.L.S.
- White, Edward
- Wilks, Rev. W., V.M.H.

AWARDS GIVEN BY THE COUNCIL AFTER CONSULTATION
WITH THE JUDGES.

The order in which the names are entered under the several medals and cups has no reference whatever to merit, but is purely accidental.

The awards given on the recommendation of the Floral and Orchid Committees will be found in their respective Reports.

Gold Medal.

Lieut.-Col. Sir George Holford, K.C.V.O., C.I.E., Tetbury (gr. Mr. H. G. Alexander), for Orchids.

The Hon. Vicary Gibbs, Elstree (gr. Mr. E. Beckett, V.M.H.), for vegetables.

Messrs. Blackmore & Langdon, Twerton-on-Avon, for Begonias.

Messrs. Frank Cant, Colchester, for Roses.

Messrs. Jas. Carter, Raynes Park, S.W., for flowering plants and vegetables.

Messrs. Charlesworth, Haywards Heath, for Orchids.

Messrs. W. Cutbush, Highgate, N., for Carnations and Roses.

Messrs. Cuthbert, Southgate, N., for Azaleas.

Messrs. Alex. Dickson, Newtownards, for Roses and Tulips.

Messrs. Dobbie, Edinburgh, for Sweet Peas, Dahlias, and Violas.

Messrs. Engelmann, Saffron Walden, for Carnations.

Messrs. W. Fromow, Chiswick, W., for Japanese Maples.

Messrs. H. B. May, Upper Edmonton, N., for Ferns and flowering plants.

Messrs. W. Paul, Waltham Cross, N., for Roses.

Messrs. J. Piper, Bayswater, W., for Wistarias, Fuchsias, rock garden, and topiary work.

Messrs. Thos. Rivers, Sawbridgeworth, for fruit trees.

Mr. L. R. Russell, Richmond, S.W., for stove and greenhouse plants.

Messrs. F. Sander, St. Albans, for Orchids.

Messrs. Sutton, Reading, for Tulips and florists' flowers.

Messrs. James Veitch, Chelsea, S.W., for stove and greenhouse plants.

Messrs. James Veitch, Chelsea, S.W., for trained fruit trees.

Messrs. James Veitch, Chelsea, S.W., for flowering plants.

Messrs. R. Wallace, Colchester, for rock and formal garden.

Messrs. J. Waterer, Bagshot, for flowering plants.

Mr. J. Wood, Boston Spa, Yorks, for a rock garden.

Farrer Cup.

To Messrs. Bees, Mill Street, Liverpool, for alpine plants.

Davidson Cup for the best Cattleya species in the Show.

Messrs. Charlesworth, Haywards Heath, for *Cattleya Lawrenceana* 'Mary Regina.'

Silver-gilt Cup.

Sir Jeremiah Colman, Bart., Reigate (gr. Mr. J. Collier), for Orchids.

Messrs. J. Backhouse, York, for a rock and water garden.

Messrs. Barr, Covent Garden, for a rock and water garden.

Messrs. Bunyard, Maidstone, for Apples.

Messrs. G. Jackman, Woking, for Clematis and shrubs.

Messrs. J. Piper, Bayswater, W., for a rock and water garden.

Messrs. James Veitch, Chelsea, S.W., for Tulips.

Messrs. R. Wallace, Colchester, for herbaceous flowers.

Large Silver Cup.

Mr. A. F. Dutton, Iver, Bucks, for Carnations.

Messrs. Paul, Cheshunt, for Roses and Azaleas.

Messrs. J. Peed, West Norwood, S.E., for Caladiums and flowering plants.

Messrs. Perry, Enfield, N., for herbaceous flowers and Ferns.

Mr. M. Prichard, Christchurch, for alpine garden and hardy flowers.

Mr. L. R. Russell, Richmond, S.W., for foliage and flowering plants.

Messrs. Sutton, Reading, for vegetables.

Mr. Charles Turner, Slough, for Roses and Carnations.

Messrs. E. Webb, Stourbridge, for Calceolarias and Cinerarias.

Messrs. Young, Hatherley, Cheltenham, for Carnations.

Silver Cup.

The Hon. Vicary Gibbs, Elstree (gr. Mr. E. Beckett, V.M.H.), for Cape Pelargoniums.

Miss M. C. Troyte-Bullock, Yeovil, for Cape Pelargoniums.

Leopold de Rothschild, Esq., Leighton Buzzard (gr. Mr. J. Jennings), for Carnations.

Messrs. Armstrong & Brown, Tunbridge Wells, for Orchids.

Messrs. B. R. Cant, Colchester, for Roses.

Messrs. J. Carter, Raynes Park, S.W., for formal garden.

Messrs. J. Cheal, Crawley, for formal garden, alpine plants and shrubs.

Messrs. W. Cutbush, Highgate, N., for flowering plants.

Messrs. J. Cypher, Cheltenham, for Orchids.

Messrs. J. Hill, Lower Edmonton, N., for Ferns.

Hobbies, Ltd., East Dereham, for Roses.

Messrs. S. Low, Enfield, N., for Orchids.

Messrs. A. & J. McBean, Cooksbridge, for Orchids.

Mr. J. MacDonald, Harpenden, for grasses.

Messrs. G. Mount, Canterbury, for Roses.

Messrs. Pulham, Newman Street, W., for rock garden.

Messrs. T. S. Ware, Feltham, for rock garden.

Standard Cup.

Messrs. G. Beckwith, Hoddesdon, for Roses.

Mrs. B. Borrett, Castlethorpe, for Schizanthus.

Mr. A. J. A. Bruce, Chorlton-cum-Hardy, for Sarracenias.

The Craven Nursery, Clapham, Lancs, for rock garden.

Messrs. Cunningham, Fraser, Edinburgh, for alpine plants.

Mr. E. H. Davidson, Twyford, for Orchids.

Mr. Clarence Elliott, Stevenage, for rock garden.

Mrs. V. A. Litkie, Maidenhead (gr. Mr. W. Hulbert), for Calceolarias.

Dr. John Macwatt, Morelands, Duns, N.B., for Primulas.

Messrs. Mansell & Hatcher, Rawdon, Leeds, for Orchids.

Mr. Reginald Prichard, West Moors, Wimborne, for alpine plants.

Mr. George Prince, Longworth, Berks, for Roses.

Mr. G. Reuthe, Keston, Kent, for rock garden and hardy flowers.

Messrs. Whitelegge & Page, Chislehurst, for rock garden and alpine plants.

Silver-gilt Hogg Medal.

Messrs. Laxton Bros., Bedford, for Strawberries and fruit trees.

Silver-gilt Flora Medal.

Messrs. Barr, Covent Garden, W.C., for Tulips.

Mr. B. E. Bell, Guernsey, for Carnations.

Mr. James Box, Lindfield, for hardy plants.

Mr. H. Burnett, Guernsey, for Carnations.

Messrs. Clark, Dover, for hardy plants.

Messrs. Hassall, Southgate, for Orchids.

Messrs. Hogg & Robertson, Dublin, for Tulips.

Messrs. J. Jefferies, Cirencester, for Tulips.

Messrs. S. Low, Enfield, N., for Carnations.

Messrs. Phillips & Taylor, Bracknell, for hardy flowers.

Messrs. T. S. Ware, Feltham, for Begonias and hardy flowers.

Silver-gilt Knightian Medal.

The King's Acre Nurseries, Hereford, for fruit trees in pots.

Silver-gilt Banksian Medal.

Messrs. Allwood, Hayward's Heath, for Carnations.

Messrs. Artindale, Sheffield, for aquatics and hardy plants.

Messrs. Bakers, Wolverhampton, for alpine and bog plants.

Messrs. Fletcher, Chertsey, for American plants.

Messrs. G. Gibson, Bedale, for herbaceous flowers.

The Guildford Hardy Plant Nursery, Guildford, for rock garden.

Messrs. Kelway, Langport, for herbaceous flowers.

Messrs. R. P. Ker, Liverpool, for Amaryllis.

Mr. C. W. Needham, Hale, Cheshire, for Tulips.

Mr. R. C. Notcutt, Woodbridge, for flowering and foliage plants.

Messrs. Watkins & Simpson, Covent Garden, for annuals.

Silver Flora Medal.

Messrs. R. H. Bath, Wisbech, for Tulips and Carnations.

Mr. C. Blick, Hayes, Kent, for Carnations.

Mr. C. Bourne, Bletchley, for Tulips.

A. P. Brandt, Esq., Bletchingley (gr. J. W. Barks), for Pelargoniums.

The Rev. H. Buckston, Derby (gr. A. Shambrook), for Calceolarias.

The Burton Hardy Plant Co., Christchurch, for rock garden.

Messrs. Cannell, Swanley, for Cannas and Pelargoniums.

Messrs. Carter Page, London Wall, for Dahlias and Violas.

Mr. J. Douglas, Great Bookham, for Carnations.

Mrs. Lloyd Edwards, Llangollen (gr. Mr. Roberts), for Saxifrages.

Mr. S. W. Flory, Twickenham, for Orchids.

Messrs. W. J. Godfrey, Exmouth, for Pelargoniums and Poppies.

Messrs. Gunn, Olton, for Phloxes and alpine plants.

Mr. H. Hemsley, Crawley, for Alpine garden.

Mrs. J. Rolls Hoare, Horsham (gr. J. W. Seden), for Pelargoniums.

The Misses Hopkins, Shepperton, for herbaceous plants.

Messrs. E. W. King, Coggeshall, for Sweet Peas.

Messrs. Robt. Sydenham, Birmingham, for Sweet Peas.

Messrs. Thompson & Charman, Bushey, for hardy plants.

Messrs. R. Veitch, Exeter, for Calceolarias.

The Wargrave Plant Farm, Wargrave, for Tulips and herbaceous plants.

Mr. Carlton White, Bond Street, W., for clipped box and yew trees.

Silver Knightian Medal.

Thatcham Fruit Farm for vegetables.

Silver Banksian Medal.

Messrs. Allen, Norwich, for Roses.

Mr. E. C. Bowell, Cheltenham, for alpine plants.

Mr. H. H. Crane, Highgate, for Violas.

Mr. H. Dixon, Wandsworth, for Orchids.

Messrs. John Forbes, Hawick, for herbaceous plants.

Mr. H. J. Jones, Lewisham, for Pelargoniums.

Messrs. Kent & Brydon, Darlington, for alpine plants and Lilies of the Valley.

Messrs. B. Ladhams, Shirley, Hants., for hardy plants.

Mr. W. Lawrenson, Yarm-on-Tees, for Primulas.

Mr. W. A. Manda, St. Albans, for foliage and flowering plants.

Mr. G. W. Miller, Wisbech, for herbaceous flowers.

Mr. S. Mortimer, Farnham, Surrey, for Stocks and Carnations.

Messrs. Reamsbottom, Geashill, Ireland, for St. Brigid Anemones.

Messrs. W. H. Rogers, Southampton, for shrubs and alpine plants.

Messrs. R. Tucker, Oxford, for rock garden.

Mr. C. F. Waters, Balcombe, for Orchids.

Mr. J. D. Webster, Chichester, for Carnations.

Messrs. W. Wells, Merstham, for Carnations.

Bronze Flora Medal.

Messrs. Barrie & Brown, 39 King William Street, E.C., for herbaceous plants.

Messrs. Brown, Stamford, for Roses and Lilacs.

Mr. T. E. Dawes, Syderstone, for Rhubarb.

Mr. R. de E. Day, Sutton Scotney, for Spanish Irises.

Mr. H. N. Ellison, West Bromwich, for Ferns and Palms.

Stuart Maples, Esq., Stevenage, for alpine and rockwork.

AWARDS TO EXHIBITS OF HORTICULTURAL SUNDRIES.

Silver-gilt Flora Medal.

Mrs. Edith Fisher, East Molesey, for water-colour drawing of gardens.

Silver-gilt Banksian Medal.

Messrs. Jas. Carter, Raynes Park, S.W., for seed-testing experiments.

Castles Shipbreaking Co., Millbank, S.W., for garden furniture.

Messrs. Drew, Clark, Leyton, for diamond extension ladders.

Messrs. Sutton, Reading, for botanical and scientific exhibits.

Messrs. W. Wood, Wood Green, N., for garden houses and pergola.

Silver Banksian Medal.

The Acme Patent Ladder Co., Earlsfield, for ladders and barrows.

Miss E. A. Adie, 9 Brechin Place, S.W., for water-colour paintings.

Messrs. Benton & Stone, Birmingham, for syringes.

Messrs. Cooper Pegler, Christopher Street, E.C., for spraying machines.

Messrs. T. Crowther, Fulham, for iron gates, stone seats, &c.

The Dryad Works, Leicester, for Dryad cane furniture.

The En-Tout-Cas Co., Leicester, for garden seats and trellis work.

The Four Oaks Spraying Machine Co., Sutton Coldfield, for spraying machines.

Messrs. A. W. Gamage, Holborn, E.C., for garden houses, tents, &c.

Messrs. T. Green, Southwark Street, S.E., for lawn mowers and rollers.

Messrs. H. Hartjen, 35 Noble Street, E.C., for spraying machines.

Messrs. Headley, Bishopsgate, E.C., for garden books and pictures.

Messrs. J. H. Heathman, Parson's Green, S.W., for ladders, hose, &c.

Messrs. Hughes Bolckow, Blyth, for teak-wood garden furniture.

Messrs. C. P. Kinnell, Southwark Street, S.E., for heating apparatus and boilers.

Messrs. Liberty, Regent Street, W., for summer-houses and garden furniture.

Messrs. Maggs, Clifton, for teak garden seats, folding chairs and tents.

The Patent Safety Ladder Co., Peterborough, for extension ladders.

The Potter's Arts Guild, Guildford, for terra-cotta garden furniture.

Messrs. Pulham, Newman Street, W., for paved garden, fountain, &c.

Messrs. Purser, Hatton Garden, E.C., for spraying apparatus.

Messrs. D. Roberts, Tottenham, N., for tubs for shrubs.

Messrs. W. Duncan Tucker, Tottenham, N., for greenhouses and boilers.

The United Brass-Founders and Engineers Co., Manchester, for spraying machines.

Messrs. R. Wallace, Colchester, for garden plans.

Messrs. Watkins & McCombie, 19 Paternoster Row, E.C., for horticultural illustrations.

Messrs. J. P. White & Sons, Bedford, for garden furniture.

Bronze Banksian Medal.

Messrs. Barr, Covent Garden, W.C., for garden requisites.

Messrs. Blake & Mackenzie, Liverpool, for flower-pots and seed testers.

The Economic Fencing Co., Billiter House, E.C., for wood fencing, &c.

Messrs. Fenlon, Tudor Street, E.C., for new hot-water boilers.

The Hardy Patent Pick Co., Sheffield, for garden forks and spades.

Mr. Robert Hughes, Potter's Bar, for water-colour drawings of gardens.

The Leyton Timber Co., Deptford, for rustic garden furniture.

The London, Provincial, and Export Co., Wandsworth, S.W., for garden furniture.

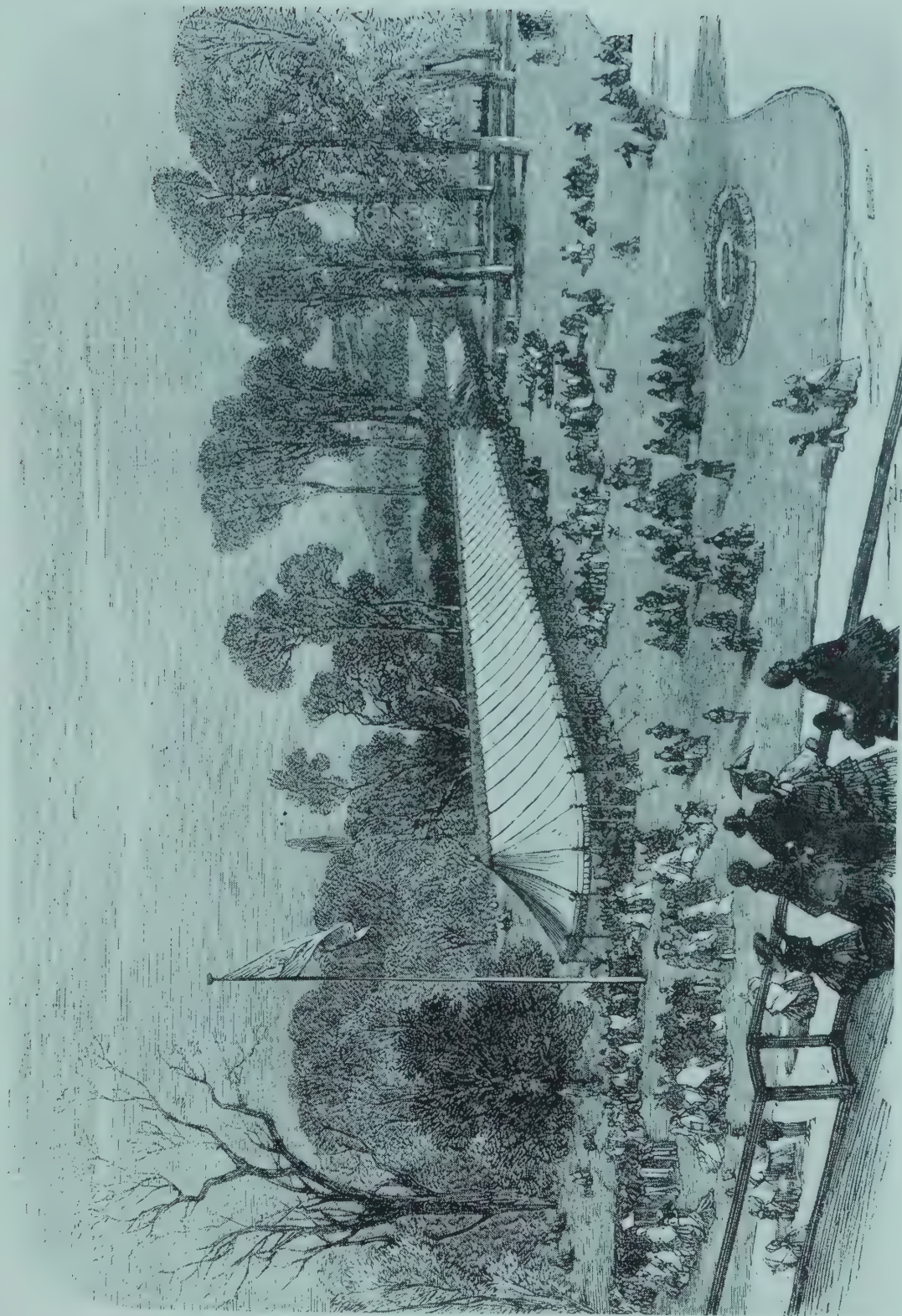


FIG. 142.—THE R.I.S. SUMMER SHOW AT GORE HOUSE, KENSINGTON, MAY 16, 1855.
[Reduced from *The Illustrated London News* of May 19, 1855.]

Mr. John Pinches, Camberwell, S.E., for "Acme" garden labels.
 The Selborne Society, Hanwell, W., for bird-nesting boxes.
 Messrs. R. Sydenham, Birmingham, for rustic table decorations.
 Messrs. T. Syer, 45 Wilson Street, E.C., for garden furniture.
 Messrs. Vipan & Headly, Leicester, for garden seats.

GENERAL MEETING.

JUNE 3, 1913.

Mr. JOSEPH CHEAL in the Chair.

Fellows elected (119).—Miss G. Adams, Mrs. W. Adamson, T. F. Agar, Capt. F. H. Alexander, Mrs. W. Anderson, Mrs. Anson, Mrs. R. H. Attenborough, H. E. Baker, J. S. Baker, Mrs. G. Barnes, Mrs. J. N. Beach, R. H. Beauchamp, Mrs. R. L. Beausire, Mrs. Berry, Miss E. D. Bibby, Miss W. Bompas, A. G. Bousfield, L. N. Boustead, Mrs. F. Brewster, F. E. T. Briscoe, Hon. Mrs. A. G. Calthorpe, Mrs. Frank Capper, Major J. T. Carpenter-Garnier, M. Carrington-Sykes, M.D., Miss Casey, Miss H. F. Cholmeley, Mrs. C. Fell Clark, Mrs. D. Clark, R. M. Cocks, Miss A. B. Cooper, Mrs. J. D. Cormack, Mrs. F. J. G. Cross, F. N. Davidson, R. Davies, J.P., A. Dolton, Mrs. E. Durrant, Miss J. C. Eaton, Miss Folkes, G. Fowler, Mrs. G. Fowler, Hon. Mrs. A. Fraser, Rev. J. M. Freshfield, Sir Bampfylde Fuller, K.C.S.I., C.I.E., C. Godfrey, M.V.O., M.A., H. P. Gray, Mrs. H. E. Greenstreet, F. Hadden, Mrs. W. Hadley, Lady Harcourt, Mrs. Hargreave, C. Hart, H. H. Hart, M. Hart, Sir Arthur J. Herbert, G.C.V.O., Mrs. Hickson, Mrs. T. E. Hodgkin, L. H. R. Hollebone, Col. E. J. Hollway, Mrs. J. A. Hood, C. R. Jacomb, Mrs. E. Johnson, Mrs. W. L. Johnson, Mrs. H. G. Johnston, Miss E. C. Kearton, Mrs. R. A. Ker, Mrs. V. M. Kirke, Miss E. Lee-Warner, Mrs. D. A. Lemon, C. Lewisohn, Capt. Hon. M. Lyon, F. McDougall, W. C. Mansell, Rev. H. J. Marshall, Miss J. Maw, Miss Maynard, Mrs. Mayne, Mrs. J. E. Mills, Dr. H. R. Mosse, Hon. Mrs. A. J. Mulholland, Mrs. Murray-Johnson, Miss E. A. Nurse, Miss F. A. Nurse, Miss E. M. Paice, F. L. Paine, Mrs. H. Papillon, J. Pigg, G. A. Price, F. W. Procter, J.P., Miss A. T. Procter, H. E. Richardson, Mrs. C. Ridley, T. H. Robertson, Lady Ryan, Mrs. A. C. Salter, F. G. Sargood, Miss S. Sassoon, Rev. L. Savill, Mrs. A. Sconce, Miss A. M. Smallwood, H. Smith, R. R. C. Sperling, Miss S. B. Steel, G. Stehn, C. E. Taylor, Mrs. C. G. Toller, M. Tosetti, F. Trippear, F. M. Voules, Mrs. T. Wade, F. W. Walker, H. F. Waring, C. W. Wedekind, Miss J. Welch, F. White, Mrs. H. Williams, Hon. Mrs. Guy Wilson, Hon. Mrs. R. Wilson, H. R. Yerburch-Bonsey, Lieut.-Col. J. A. C. Younger.

Fellow resident abroad (1).—R. D. Fordham (India).

Associate (1).—A. B. Mensah.

A lecture on the "Wild Flowers of Mahabaleshwar, India," was given by Prof. O. V. Muller, M.A., I.E.S., and illustrated by paintings by Mrs. Muller.

GENERAL MEETING.

JUNE 17, 1913.

Sir FREDERICK W. MOORE, M.A., F.L.S., V.M.H., in the Chair.

Fellows elected (73).—D. H. Anderson, The Marchioness of Anglesey, C. H. Bailey, Mrs. Baird, Mrs. E. Baker, Mrs. K. E. Bentley, G. P. Berry, J. K. Birch, Hon. Stuart P. Bouverie, Mrs. W. J. Brooke, Col. C. B. Brownlow, Mrs. Cadogan, J. Carmichael, J.P., Mrs. J. Carmichael, A. Carpmael, J. A. Castle, Miss Chippindale, P. Cross, J. H. Crowley, A. Curtis, C. N. Daniel, Mrs. H. Dent, Miss B. de Pledge, Miss K. D. Digby, Mrs. E. G. Edgar, Mrs. M. H. Egan, Mrs. B. Garfit, Hon. Mrs. Gerald Gibbs, Miss C. M. Greaves, A. F. Haines, Mrs. R. G. Halstead, Mrs. Heatley, R. Hendry, Mrs. B. Heywood, Mrs. J. G. Hodgson, Mrs. H. Homan, Mrs. W. M. Hornby, Lady Hely-Hutchinson, Mrs. L. H. Kiek, Mrs. H. E. Kirby, The Countess of Kinnoull, George Kitchen, Mrs. A. Landau, Miss A. Large, O. T. Leighton, Capt. G. R. B. Moody, Mrs. Hopkin Morris, Mrs. R. Scott Morton, Mrs. H. Nicoll, Mrs. Noble, Mrs. M. Ord-Mackenzie, W. C. O'Sullivan, W. W. Otter, Mrs. W. H. Peech, W. E. Pimm, Mrs. J. Purkis, C. R. Rivington, J.P., Miss R. S. Rogers, Sir Percy Sanderson, K.C.M.G., Mrs. W. M. Scott, Miss K. M. Sharpe, B. Smith, Mrs. E. Smith, A. H. B. Sperling, Mrs. Stevenson, Mrs. A. Sykes, F. Treherne Thomas, Mrs. A. R. Vincent, J. G. Watson, Miss H. S. Wilkinson, Mrs. Kirkaldy Willis, C. H. Wise, M. Wright.

Fellow resident abroad (1).—Cecil Pragnell (Victoria, B.C.).

A lecture on "The Evolution of Plants, and the Directivity of Life as shown by Vegetative Structures" was given by the Rev. Prof. G. Henslow, M.A., V.M.H. (see p. 338).

HOLLAND PARK SHOW.

JULY 1, 2, AND 3, 1913.

JUDGES.

ORCHIDS.

Chapman, H. J.
Crawshay, de Barri
Shill, J. E.

ROSES.

Jefferies, W. J.
Mease, W.
Page Roberts, Rev. F.
Piper, T. W.

CARNATIONS.

Jennings, J.
MacLeod, J. F.
Turner, Arthur

BEGONIAS (TUBEROUS).

Blick, C.
Chapman, A.
Odell, J. W.

SWEET PEAS.

Bates, W.
Gordon, Geo., V.M.H.
Watkins, A.

FRUIT AND VEGETABLES.

Challis, T., V.M.H.
Poupart, W.
Rollit, Sir Albert K., LL.D.
Thomas, O., V.M.H.

HARDY HERBACEOUS PLANTS AND
GORDON LENNOX CUP.

Beckett, E., V.M.H.
Cheal, J.
Hales, W.
Lynch, R. Irwin, M.A., V.M.H.
Notcutt, R. C.
Paul, G., V.M.H.
Shea, C. E.

ROCK, ALPINE, AND WATER
GARDENS.

Bedford, A.
Bilney, W. A., J.P.
Bowles, E. A.
Divers, W. H., V.M.H.

FOLIAGE PLANTS.

Bain, W.
Baker, W. G.
Hudson, J., V.M.H.
Wythes, G., V.M.H.

OTHER FLOWERING PLANTS.

Howe, W.
Reynolds, G.
Turner, T. W.

PLANTS NOT INCLUDED IN ABOVE.

Bean, W. J.
Davis, J.

HORTICULTURAL SUNDRIES.

Allan, A. R.
Basham, J.
Markham, H.
Woodward, G.

SHERWOOD AND WIGAN CUPS FOR
ROSES.

Dixon, C.
Pearson, A. H., V.M.H.
Wigan, A. L.

AFFILIATED SOCIETIES CHALLENGE
CUP FOR HARDY FLOWERS.

Cuthbertson, W.
Green, J.
Pearson, C. E.

AWARDS GIVEN BY THE COUNCIL AFTER CONSULTATION
WITH THE JUDGES.

The order in which the names are entered under the several medals and cups has no reference whatever to merit, but is purely accidental.

The awards given on the recommendation of the Floral and Orchid Committees will be found in their respective reports.

Coronation Cup (for most meritorious Exhibit in the Show).

Messrs. F. Sander, St. Albans, for Orchids.

Gold Medal.

Lord Llangattock, Monmouth (gr. Mr. T. Coomber), for Pine-apples.

Sir Randolph Baker, Bart., Blandford (gr. Mr. A. E. Usher), for Sweet Peas.

The Hon. Vicary Gibbs, Elstree (gr. Mr. E. Beckett, V.M.H.), for vegetables.

Messrs. Blackmore & Langdon, Bath, for Begonias.

Messrs. Charlesworth, Haywards Heath, for Orchids.

Messrs. Dobbie, Edinburgh, for Sweet Peas.

Messrs. H. B. May, Edmonton, N., for exotic ferns.

Messrs. Paul, Cheshunt, for Roses.

Messrs. W. Paul, Waltham Cross, for Roses.

Messrs. Sander, St. Albans, for Orchids.

Messrs. Sutton, Reading, for Sweet Peas.

Messrs. J. Veitch, Chelsea, for fruit trees in pots.

Messrs. J. Veitch, Chelsea, for Chinese plants.

Messrs. R. Wallace, Colchester, for ornamental water garden.

Silver-gilt Cup.

Mr. James Box, Lindfield, for water garden, Sweet Peas, &c.

Mr. L. R. Russell, Richmond, S.W., for stove plants and Ivies.

Large Silver Cup.

Sir Jeremiah Colman, Bart., Reigate (gr. Mr. J. Collier), for Orchids.

Messrs. G. Bunyard, Maidstone, for Roses and hardy flowers.

Messrs. W. Cutbush, Highgate, for Carnations and Roses.

Mr. Chas. Turner, Slough, for Roses.

Silver Cup.

Messrs. Barr, Covent Garden, W.C., for flowering plants.

Messrs. Brown, Stamford, for Roses.

Messrs. J. Carter, Raynes Park, S.W., for water garden.

Mr. A. Ll. Gwillim, Eltham, for Begonias.

Messrs. S. Low, Enfield, N., for Roses and Carnations.

Messrs. Mansell & Hatcher, Rawdon, for Orchids.

Messrs. J. Piper, Bayswater, W., for formal garden.

Mr. M. Prichard, Christchurch, for hardy flowers.

Messrs. James Veitch, Chelsea, for flowering plants.

Standard Cup.

J. S. Arkwright, Esq., Presteign, for *Lychnis Arkwrightii*.

Messrs. Fromow, Chiswick, W., for Japanese Maples.

Messrs. G. Jackman, Woking, for Roses and Clematis.

Messrs. S. Low, Enfield, for Orchids.

Messrs. J. Peed, West Norwood, S.E., for Caladiums.

Mr. Amos Perry, Enfield, for herbaceous plants.

Silver-gilt Hogg Medal.

S. Heilbut, Esq., Maidenhead (gr. Mr. Camp), for pot fruit trees.

Silver-gilt Knightian Medal.

Messrs. Laxton, Bedford, for Strawberries.

Silver-gilt Flora Medal.

W. M. Gott, Esq., Par Station (gr. Mr. G. Hillman), for Carnations.

Messrs. Bakers, Codsall, Staffs, for alpine plants.

Mr. B. E. Bell, Guernsey, for Carnations.

Mr. H. Burnett, Guernsey, for Carnations.

Messrs. B. R. Cant, Colchester, for Roses.

Messrs. F. Cant, Colchester, for Roses.

Messrs. J. Cheal, Crawley, for ornamental garden.

Messrs. Clark, Dover, for hardy flowers.

Mr. C. Engelmann, Saffron Walden, for Carnations.

Mr. S. W. Flory, Twickenham, for Orchids.

Messrs. Hobbies, E. Dereham, for Roses.

Messrs. J. K. King, Coggeshall, for Sweet Peas.

Silver-gilt Banksian Medal.

Lord Burnham, Beaconsfield (gr. Mr. G. Johnson), for Carnations.
Mary, Countess of Ilchester, Holland House, W. (gr. Mr. C. Dixon),
for Sempervivums and Saxifrages.

Messrs. Bees, Liverpool, for new Chinese Primulas.

Messrs. Bide, Farnham, for Sweet Peas.

Messrs. J. Forbes, Hawick, N.B., for Phloxes and Pentstemons.

Messrs. Gunn, Olton, for Phloxes.

Messrs. Harkness, Bedale, for hardy flowers.

Messrs. H. J. Jones, Lewisham, for Phloxes and Campanulas.

Messrs. E. W. King, Coggeshall, for Sweet Peas.

Mr. Geo. Prince, Oxford, for Roses.

Mr. G. Reuthe, Keston, for hardy plants and shrubs.

Messrs. F. Smith, Woodbridge, for hardy flowers.

Messrs. G. Stark, Great Ryburgh, for Sweet Peas.

Messrs. T. S. Ware, Feltham, for Begonias and alpine plants.

Silver Flora Medal.

Rev. L. C. Chalmers-Hunt, Letchworth, for vegetables and Roses.

Messrs. Cuthbert, Southgate, for *Humea elegans*.

Mr. H. Dixon, Wandsworth, S.W., for Orchids.

Mr. J. Douglas, Great Bookham, for border Carnations.

Messrs. W. Fells, Hitchin, for herbaceous plants.

The Guildford Hardy Plant Nursery, for herbaceous plants.

Mr. T. R. Hayes, Keswick, for heaths and alpine plants.

Mr. H. Hemsley, Crawley, for Antirrhinums, &c.

Mr. F. Lilley, Guernsey, for Gladioli and Sparaxis.

Mr. J. Mattock, Oxford, for Roses.

Mr. R. C. Notcutt, Woodbridge, for Roses.

Messrs. Phillips & Taylor, Bracknell, for water garden.

Mr. R. Prichard, West Moors, for hardy flowers.

Messrs. R. Sydenham, Birmingham, for Sweet Peas.

Messrs. Thompson & Charman, Bushey, for hardy plants.

Messrs. J. Veitch, Chelsea, for Orchids.

Messrs. Whitelegge & Page, Chislehurst, for Sweet Peas.

Silver Banksian Medal.

Lady Northcliffe, Guildford (gr Mr. J. Goatley), for *Crassula coccinea*.

Messrs. R. H. Bath, Wisbech, for Roses and herbaceous plants.

Messrs. G. Bolton, Buntingford, for Roses.

Messrs. Bull, Frome, for hardy flowers.

Messrs. Carter Page, London Wall, E.C., for Dahlias and Violas.

Mr. H. H. Crane, Highgate, for Violas and Violettas.

Mr. Walter Easlea, Eastwood, Essex, for Roses.

Mr. Clarence Elliott, Stevenage, for alpine plants.

Messrs. G. Gibson, Bedale, for hardy plants.

Messrs. Godfrey, Exmouth, for Pelargoniums.
 Messrs. Kelway, Langport, for Delphiniums.
 Mr. E. V. Low, Haywards Heath, for Orchids.
 Mr. James MacDonald, Harpenden, for Grasses.
 Mr. G. W. Miller, Wisbech, for herbaceous plants.
 Messrs. Morse, Woodbridge, for Roses.
 Mr. W. H. Page, Hampton, for flowering plants.
 The Wargrave Plant Farm, Wargrave, for hardy flowers.
 Messrs. Watkins & Simpson, London, W.C., for Antirrhinums.
 Mr. J. D. Webster, Chichester, for Sweet Peas.
 Mr. Carlton White, 53 New Bond Street, W., for clipped trees.

Certificate of Appreciation.

Mr. H. Hemsley, Crawley, for work in raising new Antirrhinums.

AWARDS TO EXHIBITS OF HORTICULTURAL SUNDRIES.

Silver-gilt Banksian Medal.

Messrs. T. Crowther, Fulham, for ornamental stone and iron work.
 Messrs. Gamage, Holborn, for garden tents and chairs.

Silver Banksian Medal.

Messrs. Abbott Bros., Southall, for Osterley table trays, &c.
 Messrs. Benton & Stone, Birmingham, for spraying machines.
 Messrs. Castles, Millbank, Westminster, for garden furniture.
 Messrs. Liberty, Regent Street, W., for Japanese garden ornaments.

Bronze Banksian Medal.

Messrs. Barr, Covent Garden, for tools and implements.
 Messrs. Jos. Bentley, Barrow-on-Humber, for horticultural chemicals.
 Mr. John Bradley, Duffield, Derby, for Bunty tea-house.
 Miss Edith Fisher, East Molesey, for water-colour drawings.
 The Four Oaks Spraying Machines, Sutton Coldfield, for spraying machines.
 Messrs. Heathman, Parson's Green, S.W., for ladders, hose, &c.
 Mr. Robert Hughes, Potter's Bar, for water-colour drawings.
 Miss Mitchell, Meath Home, Godalming, for garden baskets.
 Mr. John Pinches, Camberwell, S.E., for labels and exhibition boxes.
 Messrs. W. Voss, Millwall, E., for insecticides.
 Messrs. E. A. White, Paddock Wood, for insecticides and sprayers.

DEPUTATION TO BRISTOL.

JULY 2, 1913.

ON Wednesday, July 2, at the invitation of the Council of the Royal Agricultural Society, a Deputation consisting of the President of the Society, Field Marshal the Right Hon. the Lord Grenfell, G.C.B., G.C.M.G., accompanied by Baron Schröder, Sir Harry J. Veitch,

V.M.H., Mr. H. B. May, V.M.H., and the Rev. W. Wilks, M.A., V.M.H., visited the Flower Show held in connexion with the Royal Agricultural Show at Bristol.

On arriving at the station the Deputation found its way to the somewhat distant Show ground on Clifton Down and were welcomed at the entrance by Mr. McRow, the Secretary of the R.A.S., and directed by him to the still distant flower tents where the Hon. John Boscawen was in readiness to escort the Deputation round all the Exhibits. The Show proved to be a really magnificent one, and the Deputation appreciated it very highly, as may be seen by the number and grade of the awards which they made.

After finishing their work the Deputation were very handsomely entertained at luncheon by the Right Hon. Lord Northbrook, Sir Gilbert Greenall, Bart., and other members of the Council of the Royal Agricultural Society. The Deputation returned to London the same evening after a very strenuous day—the heat of the sun on Clifton Down having been somewhat excessive.

Gold Medal.

Sir George Holford, K.C.V.O., C.I.E., for Orchids.

Silver-gilt Cup.

Sir George Holford, K.C.V.O., C.I.E., for Amaryllis.

Messrs. Blackmore & Langdon, for Begonias.

Duke of Portland, for Fruits.

Messrs. May, for Ferns.

Large Silver Cup.

Messrs. Cypher, for group of plants.

Kingsacre Nurseries, for fruit trees in pots.

Messrs. House, for Alpines in pans.

Messrs. Sutton, for fruit, flowers, and vegetables.

Silver Cup.

Mr. Holmes, for group of plants.

Messrs. Harkness, for herbaceous.

Messrs. Low, for mixed group.

Standard Cup.

Messrs. Mallett, for rock plants.

Messrs. Carter, for vegetables.

Messrs. Gibson, for herbaceous.

Messrs. Jefferies, for coniferous plants.

Messrs. Dicksons, for Roses.

Messrs. Godfrey, for Pelargoniums, &c.

Mr. Wall, for Carnations.

Messrs. Armstrong & Brown, for Orchids.

Mr. Hill, for Sweet Peas.

Silver-gilt Flora Medal.

Messrs. Dobbie, for Sweet Peas.
Mr. Adams, for Roses.
Messrs. Young, for Carnations.

Silver-gilt Banksian Medal.

Messrs. E. W. King, for Sweet Peas.
Mr. Jarman, for Roses and Sweet Peas.
Mr. W. J. Unwin, for Sweet Peas.
Messrs. Cooling, for Roses.

Silver Knightian Medal.

Messrs. Toogood, for vegetables.

Silver Flora Medal.

Messrs. Artindale, for water garden.
Messrs. Walters, for Roses.
Messrs. Kelway, for Delphiniums.
Messrs. R. Veitch, for miscellaneous plants.
Mr. Ellison, for Ferns.
Mr. Dutton, for Carnations.
Messrs. Garaway, for Eucharis, &c.

Silver Banksian Medal.

Colonel Batten, for Orchids.
Messrs. Keeling, for Orchids.
Mr. Slade, for Pelargoniums.
Mr. Parker, for Roses.
Miss Hemus, for Sweet Peas.

GENERAL MEETING.

JULY 15, 1913.

Lieut.-Col. Sir DAVID PRAIN, C.I.E., F.R.S., V.M.H., in the Chair.

Fellows elected (109).—Dr. A. Adams, Mrs. F. G. Arkwright, Lady Baring, W. C. Barnes, G. B. Bassett, Mrs. G. A. Battcock, Mrs. H. Becker, Mrs. Bergne-Coupland, J. H. Birchenough, C.M.G., Miss A. Blenkiron, Mrs. H. F. Blyth, S. C. Boulter, R. Bright, C. Brook, Mrs. J. G. Butcher, H. B. Campbell, J. Clark, Mrs. J. J. Clarke, Mrs. M. Clutterbuck, R. Cooke, Miss A. M. L. Cox, B. F. Crewdson, W. R. Croke, Mrs. Dallas, Mrs. Danvers, Miss M. Darbyshire, Mrs. Sinclair Davidson, Mrs. H. F. Dickins, Mrs. Ducat, Dr. G. J. Eady, C. W. Farwell, R. C. Flint, J. Forrest, Mrs. Rawdon Forrest, J. Foster, Miss I. M. Gabriel, A. Gibson, Mrs. Gifford, Hon. Eveline Godley, E. A. Goulding, Mrs. H. Graystone, B. R. Hawker, Miss S. Henry, J. E. Holdsworth, A. R. Hope, Miss F. M. Hornby, A. H. Jackson, C. H. Jackson, Mrs. Judges, Mrs. Myles Kennedy, P. T. Kenway, Mrs. H. T. Ker, Florence Lady Lacon, Lady Lawrence, Mrs. J. Leeming,

J. G. Maclean, Mrs. Maconochie, H. M. Matheson, Mrs. A. E. Mills, Rev. J. Moulson, Mrs. H. Nevill, Rev. G. E. Newson, J. L. Nissen, H. Nixon, Mrs. L. Norton, F. B. Oldfield, J. H. Oram, Mrs. G. Page, E. J. Praill, J. W. Pyman, H. F. Raley, F. E. Reiss, T. W. Riakes, H. Riley, Miss M. E. Robinson, Miss A. T. Roodhouse, Mrs. H. E. Roxby, Miss A. M. Sanders, S. J. Sandle, Miss B. Scarle, Rev. R. T. Seddon, Col. C. N. Simpson, Ven. Archdeacon Sinclair, W. R. Smith, C.B., A. J. Snell, Mrs. Sonnenthal, A. H. Stenning, L. C. Stewart, G. B. Stuart, G. T. Symons, Mrs. F. R. Tebbs, Mrs. Telfer, Dr. H. S. Thomas, Miss M. Thomas, Mrs. F. R. Townend, Hon. Mrs. Cosby Trench, F. V. Turpin, H. C. Walrond, R. H. Walsh, Mrs. B. Weekes, Howell J. Williams, J.P., Mrs. Francis Williams, Mrs. Howell Williams, Mrs. W. O. Willis, John Wood, Mrs. J. Stuart Wortley, Mrs. W. Logan Wright, Alex. Young, Mrs. Young.

Fellows resident abroad (5).—J. C. Chunder (Calcutta), W. W. Johnstone (Mussoorie), Mrs. W. Montgomery (New York), Charles Parker (New York), A. E. V. Richardson, M.A., B.Sc. (Melbourne).

Associate (1).—John G. Bacon.

Society affiliated (1).—The Lion (Halstead) Horticultural Society.

The ninth MASTERS MEMORIAL LECTURE, on "Some Factors in the Prevention of Disease in Plants," was given by Prof. R. H. Biffen, M.A. (see p. 313).

DEPUTATION TO BIRMINGHAM.

JULY 18, 1913.

A DEPUTATION consisting of Sir Harry Veitch, V.M.H., Mr. H. B. May, V.M.H., Mr. George Bunyard, V.M.H., and the Assistant Secretary, visited the Annual Flower Show of the Birmingham Horticultural Society on July 18.

On the previous evening they were the guests of the Right Hon. the Lord Mayor of Birmingham at a complimentary dinner at the Queen's Hotel. It was a disappointment that the Lord Mayor himself was unable to be present owing to indisposition, but Alderman W. F. Bowater, J.P., was his deputy, and a very warm welcome he gave. There were also present at the dinner—Sir George Kenrick, Mr. W. G. Griffith (Deputy President of the Society), Dr. F. H. Maberly (Vice-Chairman), Councillor Norman Chamberlain, Councillor Wm. Cadbury, and Mr. E. H. Weaver (Chairman), Mr. Silver (Treasurer), Mr. Brace, Mr. J. Homer, and the Superintendent of the Birmingham Public Parks—Mr. Wm. Morter. The dinner passed very pleasantly, and afforded helpful intercourse relative to matters concerning Horticultural Society work.

The floral exhibits were staged in six large tents at Handsworth Park, and beautiful and praiseworthy many of them were, the list of awards following testifying to the deputation's appreciation of them.

The groups of stove and greenhouse plants were particularly attractive, whilst some of the specimen plants showed excellent culture. The show was opened by Lord and Lady Calthorpe; afterwards the Deputation were guests at the official luncheon, when Sir Harry Veitch responded to the toast of "The Royal Horticultural Society."

The Deputation having made its awards, a tour by motor-car of the public parks was made with Mr. Morter, the Superintendent. The tour included the beautiful Cannon Hill Park and Victoria Park, and the Deputation were much pleased with all they saw. The city of Birmingham is to be congratulated on the great extension of its public parks during the last ten years—no better development could possibly receive the attention of the Local Authority in such a big industrial city. Mr. Morter is to be congratulated on the work he is doing, and the Deputation tender to him their thanks for the interest he added to the visit. The kindness of Mr. Griffith is particularly appreciated, for, from first to last, he devoted himself to the comfort and enjoyment of the Deputation, including the placing of his car at their disposal during their stay.

The Birmingham Society is evidently doing a very good work for horticulture within the region of Birmingham, and the Deputation cordially hope that ere long the Show Committee's wish to bring their Annual Show up to the highest standard set by a few other provincial shows of established reputation will be realized. The Society is worthy of substantial financial support locally, and here lies its greatest need at the present moment. No Society, and particularly a Horticultural Society, can flourish except the money be forthcoming for the proper conduct of the work in hand, and money cannot be devoted to a better purpose for the enjoyment, health, and therefore wealth of the community than when applied to the beautifying of our gardens.

The following awards were made at the Show :—

Gold Medal.

To Messrs. J. Cypher, Cheltenham, for stove and greenhouse plants.

To Messrs. Sutton, Reading, for flowers and vegetables.

Silver Cup.

To His Grace the Duke of Westminster (gardener, Mr. N. F. Barnes), Eaton Hall, for fruit.

To Sir George Kenrick (gardener, Mr. J. V. MacDonald), Birmingham, for a group of plants.

To J. Arthur Kenrick, Esq. (gardener, Mr. Cryer), for a group of plants.

To Messrs. Gunn, Olton, for Roses.

To Mr. F. R. Hayes, Keswick, for a rock and water garden.

Silver-gilt Knightian Medal.

To Messrs. Webb, Stourbridge, for vegetables, &c.

Silver-gilt Flora Medal.

To Messrs Cypher, Cheltenham, for 12 stove and greenhouse plants.

To Messrs. E. W. King, Coggeshall, for Sweet Peas.

To Messrs. Herd, Penrith, for Sweet Peas.

Silver-gilt Banksian Medal.

To Mr. W. R. Manning, for a group of plants.

To H. C. Pinsent, Esq. (gardener, Mr. Corbett), for a group of plants.

Silver Knightian Medal.]

To H. Andrews, Esq. (gardener, Mr. J. R. Tooley), for a collection of fruit.

Silver Flora Medal.

To Messrs. H. J. Jones, Lewisham, for Phloxes.

To Messrs. Piper, Bayswater, for water garden and herbaceous plants.

To Mr. J. Mattock, Oxford, for Roses.

To Messrs. F. Smith, Woodbridge, for herbaceous group.

To Messrs. T. S. Ware, Feltham, for Begonias.

To the Clury Nurseries, Langley, for Carnations.

To Mr. K. Burnett, Guernsey, for Carnations.

To Mr. A. F. Dutton, Iver, for Carnations.

To Messrs. Gunn, Olton, for rock garden and Phloxes.

Silver Banksian Medal.

[To Messrs. Hewitt, Birmingham, for herbaceous.

To Mr. N. Ellison, West Bromwich, for Ferns.

To Mr. Thos. Howse, Handsworth, for a display of garden produce.

Bronze Banksian Medal.

To Mr. F. Hudman, Hamsted, for a display of garden produce.

To W. W. Emms, Harborne, for a collection of Wild Flowers.

To Leslie Robinson, Lightwood, for a collection of Wild Flowers.

DEPUTATION TO CARDIFF.

[JULY 23, 1913.

A DEPUTATION consisting of the President of the Society, the Right Hon. Lord Grenfell, Field Marshal, Sir Daniel Morris, K.C.M.G., Mr. J. Gurney Fowler (Treasurer), Mr. James Hudson, V.M.H., and the Rev. W. Wilks, M.A., V.M.H. (Secretary), visited the Show of the Cardiff Horticultural Society held on July 23.

The Deputation left London at 3.35 on Tuesday, July 22, and arrived at Llantrisant about 7.30, and at once drove to Talygarn,

where they were most hospitably received and entertained by Mr. Godfrey L. Clark, President of the Cardiff Society, whose beautiful park and garden, filled with a magnificent collection of shrubs and trees, were greatly admired.

The next morning Mr. Clark drove the Deputation into Cardiff, and a very beautiful Show was thoroughly inspected and the under-mentioned awards were made.

At the judges' luncheon the Deputation were received as honoured guests, and our President, Lord Grenfell, responded to the toast of the Royal Horticultural Society, which had been proposed by Mr. Godfrey Clark and received with much applause. '

The Deputation returned to London in the evening, with the exception of the Secretary, who went to Duffryn to arrange with Mr. Reginald Cory about the trial of Dahlias taking place in his garden. The Secretary spent two delightful days at Duffryn, enjoying the beautiful and very extensive gardens which Mr. Cory has created, and taking note of the vast extent of the Dahlias, numbering between two and three thousand plants, on their trial.

The best thanks of the Deputation are due to Mr. Godfrey Clark for his hospitality so kindly extended to them all ; and the Secretary is specially indebted to Mr. and Miss Cory for the delightful time which they gave him.

Gold Medal.

To the King's Acre Nursery, for fruit trees in pots.

To Messrs. Sutton, for fruit and vegetables, Sweet Peas.

Silver Cup.

To the Marquis of Bute, for a group of plants.

Standard Cup.

To Messrs. Cypher, for group of plants.

To Lady Hill, for group of plants.

To Messrs. House, for rock plants in pans, Sweet Peas, &c.

Silver-gilt Lindley Medal.

To the Marquis of Bute, for an Educational Exhibit of Forestry.

Silver-gilt Flora Medal.

To Mr. Mattock, for Roses.

To Mr. Crossling, for Roses.

To Messrs. Young, for Carnations.

To Messrs. Blackmore & Langdon, for Begonias.

To Mr. Vernon Hill, for Sweet Peas, herbaceous, and rock plants.

To Messrs. Artindale, for Violas and Sweet Peas.

Silver-gilt Banksian Medal.

To Messrs. H. B. May, for Ferns.

To Messrs. W. & C. Bull, for hardy flowers.

To Mr. A. F. Dutton, for Carnations.

Silver Knightian Medal.

To Mrs. Rees Jones, for vegetables.¹

To the Marquis of Northampton, for vegetables.

Silver Flora Medal.

To Mr. R. T. Went, for herbaceous flowers.

To Mr. C. Wall, for Carnations.

To Captain Lubbock, for Sweet Peas.

Silver Banksian Medal.

To the Duchess of Somerset, for Carnations.

To Mr. Pitcher, for Begonias.

To Lady Hill, for Fuchsias.

To Mr. John Oxenham, for Pelargoniums.

To Mr. E. H. Ebsworth, for Muscat Grapes.

Bronze Knightian Medal.

To Mr. David Adams, for vegetables.

To Mr. E. E. Hole, for vegetables.

To Mr. R. Smith, for vegetables.

Bronze Banksian Medal.

To Mr. E. Harvey, for annuals.

To Mr. W. Howe, for wild flowers.

To Mr. I. Mullett, for wild flowers.

To Miriam P. Duffield, for wild flowers.

To Mr. Stanley Mellings, for wild flowers.

GENERAL MEETING.

JULY 29, 1913.

Lieut.-Col. Sir DAVID PRAIN, C.I.E., F.R.S., V.M.H., in the Chair.

Fellows elected (35).—The Marquis of Anglesey, E. H. Archer, Mrs. E. Banks, J. T. Burrows, Miss Choate, Mrs. A. W. Churchill, W. W. Clarke, W. Cowe, Hon. Mrs. R. Devereux, T. E. Fright, F. Gillett, P. Good, Mrs. E. S. Handcock, W. T. Harradon, Hon. Mrs. H. Hood, T. C. Huband, E. Jeffreys, A. Johnson, G. D. Lawson, J. W. Lesley, Mrs. J. Lumsden, Miss E. A. Miller, L. C. R. Palmer, H. S. Read, W. Sandover, Mrs. Arthur Saurin, Mrs. Selous, Lieut.-Col. C. H. Smith, V.D., E. P. Smith, R. D. Trotter, Miss F. Vickery, W. Walker, H. Watson, W. N. Watson, S. H. White.

Fellows resident abroad (3).—C. M. Chatterji (Bengal), Mrs. A. P. Luxton (Victoria, B.C.), J. H. Maiden (Sydney, N.S.W.).

The tenth MASTERS MEMORIAL LECTURE, on "Some Factors in the Prevention of Disease in Plants," was given by Prof. R. H. Biffen, M.A. (see p. 313).

GENERAL MEETING.

AUGUST 12, 1913.

Mr. GEORGE GORDON, V.M.H., in the Chair.

Fellows elected (22).—E. Beresford-Peirse, J. P. Blake, C. A. Burgess, G. W. R. Foster, A. C. M. Fraser, Mrs. Harley, J. W. Heard, G. D. Hogan, W. H. Hollis, Miss M. H. Hughes, Dr. M. M. Hutchinson, Mrs. M. W. Mattinson, Rev. W. C. O'Ferrall, W. Ousely, L. H. Potter, N. W. Priaulx, Mrs. H. Reynolds, L. F. Schuster, A. Vagliano, C. H. Ward, James Williams, W. D. Wiltshire.

Fellow resident abroad (1).—de Walden Houghton (Madras).

Associate (1).—Miss F. Whistler.

A lecture on "Fairy-flies and their Hosts" was given by Mr. Frederick Enock, F.L.S.

GENERAL MEETING.

AUGUST 26, 1913.

Mr. W. A. BILNEY, J.P., in the Chair.

Fellows elected (11).—G. Cawston, J. J. Dyke, Major A. Greg, W. E. Hoare, Walter Jones, Miss F. B. Lawrence, T. A. Roberts, Miss J. Thomas, C. T. Vessey, J. T. Walker, Mrs. Wilson.

Fellows resident abroad (2).—Mrs. Ira Devonport (New York), E. C. Pratt (Hobart, Tasmania).

A lecture on "Tuberous Begonias" was given by Mr. Chas. F. Langdon, F.R.H.S. (see p. 344).

SCIENTIFIC COMMITTEE.

MAY 14, 1913.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and ten members present.

Saxifraga Mertensiana.—Mr. J. Fraser, F.L.S., showed this plant, a native of Western N. America, and remarked upon its position intermediate between two sections of the genus. The plant bore bulbils on the lower part of the inflorescence, and, like *S. cernua*, had its flowers at the tips of the branches of the inflorescence. The flowers are often defective, both the stamens being deformed and the styles absent.

Hen and Chickens Daisies.—Mr. A. Worsley showed inflorescences of the well-known 'hen and chickens' daisy from plants which had appeared in his garden, where none of this form had previously been grown.

Primula × *Bowlesii*.—Mr. Bowles showed flowers and foliage of the hybrid *Primula* × *Bowlesii* (*P. pedemontana* × *P. viscosa*) with specimens of the parents for comparison. Characters of both parents were present in the plant, which had been found two years ago on Mont Cenis (see pp. 123, 227).

Clitoria ternatea and *Passiflora foetida*.—Lady Theodora Guest sent flowers and foliage of the uncommon *Clitoria ternatea* and of *Passiflora foetida*. The latter grows wild in Ceylon and in many other tropical places, but is probably an escape from cultivation, most of the species of *Passiflora* being native in Brazil.

Orchid Hybrids.—Mr. R. A. Rolfe, A.L.S., exhibited flowers of two interesting hybrid orchids raised by himself at Kew with a view to ascertaining the parentage of certain wild forms. The first was *Odontoglossum Coradinei*, Reichb. f., obtained from *O. Lindleyanum* crossed with an unspotted *O. crispum*, the result being a yellow hybrid blotched with brown, most like the seed-bearer in general character, but completely agreeing with some of the wild forms of this natural hybrid. The cross was made in June 1907, and this is the first of several seedlings to flower. The other flower was *Laeliocattleya* × *armanda*, Reichb. f., obtained by crossing *Laelia Boothiana* with the pollen of *Cattleya intermedia*, and having flowers most like an enlarged edition of the latter with rosy-lilac segments. Of this several seedlings have flowered, the first three years ago. In this case the agreement with the wild hybrid is not complete, the tip being more strongly three-lobed and the flowers rather darker in colour. It is believed, however, to be a form of the same hybrid, which is rather variable. Its complete history is given in the *Orchid Review*, xix., pp. 216–218.

SCIENTIFIC COMMITTEE, JUNE 3, 1913.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and seven members present.

Violet with laciniate leaves.—Mr. C. T. Druery, V.M.H., sent a leaf of the sweet Violet with the margins much cut, varying from the normal type in the way in which many species of *Dianthus* vary in their petals (p. cxvii).

Daffodils from New Zealand.—Mr. E. A. Bowles showed flowers of the two varieties of Daffodil, 'King Alfred' and 'Flamingo,' now in bloom on plants raised from bulbs received from New Zealand.

Laeliocattleya × 'Freak'.—Mr. G. Wilson, F.L.S., showed a plant of *Cattleya citrina* × *Laelia purpurata* from the garden of C. J. Lucas, Esq., Warnham Court, Horsham. The flowers are intermediate in size and colour between those of the parents, and they are produced on a horizontal spike. A Certificate of Appreciation was recommended to Mr. C. J. Lucas.

Primula conspersa.—Messrs. J. Veitch showed specimens of this species of *Primula* from West Kansu, China, raised from seed collected by Mr. Purdom. It is a species of the *farinosa* section flowering later than *P. farinosa*, and with taller stems and larger flowers. The flowers are much the colour of *P. farinosa*.

Cattleya Mossiae bud sport.—Mr. E. H. Davidson sent a plant of *C. Mossiae* 'Golden Ray' having the petals marked with yellow like the labellum. It appears to be a case of irregular peloria, but differing from the usual form of peloria in having the labellum characters showing in the petals, whereas in the usual form the petal characters show in the labellum.

Seedling Saxifrage.—Mr. J. Fraser, F.L.S., exhibited a seedling from *Saxifraga Andrewsii*, the well-known hybrid; but as the seedling was self-sown he had no evidence whether it was a reversion towards *S. Aizoon*, or the result of a cross between *S. Andrewsii* × *S. Aizoon*. The reputed parentage of the former is *S. Geum* × *S. Aizoon*, and the seedling was nearer the latter than the former.

SCIENTIFIC COMMITTEE, JUNE 17, 1913.

Mr. G. MASSEE, F.L.S., V.M.H., in the Chair, and twelve members present.

Colours in Pelargoniums.—Mr. J. Fraser, F.L.S., showed specimens of, and offered remarks upon, the manner in which the bright colours of show Pelargoniums had developed from what was at first a dull-coloured flower with colours spreading merely along the veins in a double feathered line. This later became intensified, forming two spots of deep colour at the tips of the veins. Later still the colour spread from the spots until the whole of the two upper petals became

suffused with the same colour, though probably of lighter intensity, and finally the same colour spread to other parts of the flower.

Blue Oak.—Dr. A. Voelcker showed sections cut across the branches of the oak from which the piece of greenish-grey wood shown by him last year was taken. The oak is at Tewkesbury and has been struck by lightning, but it is improbable that this has had anything to do with the coloration of the wood. The dead branch had more of the colour developed than the living, but the latter showed it to a considerable extent, though in no part was it so intense as in the dead. The heart-wood was not coloured. The appearance was extremely like that described by Von Schrenk in *Bulletin* 36 of the Bureau of Plant Industry, Dep. of Agriculture, U.S. America, under the title of Bluing of Timber, and attributed to the presence of a fungus.

Foxglove branched.—Mr. E. M. Holmes, F.L.S., showed a spike of Foxglove bifurcated about a third of the way up and showing little if any sign of fasciation in the lower part. Other members referred to similar instances.

Sawfly on Apple.—Mr. E. M. Holmes also showed some sawfly larvæ which he had found feeding on the foliage of the Apple. The larvæ belong to *Lygaeonematus moestus*, which Professor Theobald has only recently recorded as British.

Rose with green petals.—Mr. F. J. Chittenden showed the flower of *Rosa canina* with green petals. It had been plucked in a hedge not far from Leatherhead by Mr. Pleese, of Merrow, who had brought it to him.

Viola with fringed foliage.—Mr. C. T. Druery, V.M.H., sent the plant, of which a leaf had been shown at the last meeting, of a *Viola* with frilled and fringed foliage. It was found in his garden at Acton, and was evidently not *V. odorata* as was at first thought. The species could not be determined from the specimen before the Committee, but was perhaps *V. Riviniana*.

Pelargonium Hybrids.—Mr. A. Langley Smith showed a series of *Pelargoniums* raised by himself. The first cross was not defined. From it were raised numerous seedlings, varying much in foliage and in habit and colouring of flowers. These were the result of self-pollinating the hybrid. The third set were the result of fertilizing the seedlings so obtained with pollen from the original hybrid. These again showed much variation in foliage &c. (p. cxix).

Gooseberries diseased.—Several specimens of Gooseberry branches were sent. They had died suddenly after starting into growth. This trouble with Gooseberries is usually due to the attack of the fungus *Botryosphaeria ribesii*. It is best to remove and burn the affected branches as soon as they are discovered, not allowing them to remain until the autumn. The branches should be cut away close to their origin, as the fungus fruits near to the base of the affected shoots.

Saxifrage Rust.—Foliage of several of the longifolia group of Saxifrages was sent from Hindhead badly attacked by a rust fungus.

This fungus is a native of Switzerland, and has previously been recorded as attacking species of this section of *Saxifraga* in this country (see *Journal of Botany*, 1908, p. 153). *Puccinia Pazschkei* differs from *P. saxifragae* in having the teleutospores warted instead of striate, and it does not appear to attack the British species of Saxifrage.

SCIENTIFIC COMMITTEE, JULY 15, 1913.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and ten members present.

Proliferation in Rose.—Mr. J. T. Bennett-Poë, V.M.H., showed a Rose having a fasciated and branched shoot bearing several buds developed from its centre. The branch below the flower showed no sign of fasciation.

Lithiasis in Pear.—Mr. W. A. Voss sent a small Pear, 'Doyenné Boussoch,' from a tree of about twenty-five years of age, showing peculiar developments of "stone-cells" breaking through the epidermis here and there. Only one or two fruits on the tree, which was bearing a heavy crop, were affected, and these were from the end of a branch. The trouble is one not commonly met with in England, and has been attributed by German investigators to insufficient water-supply.

Alder diseased.—Mr. J. O'Brien, V.M.H., sent fruits of *Alnus glutinosa*, gathered near Le Touquet from a tree bearing many similar ones, in which some of the carpels had grown out in a peculiar fashion, becoming fleshy and somewhat curled, standing out like leafy projections from the cones. The development of these peculiar growths is due to the attack of the fungus *Ascomyces alnitorquus*.

Poplar diseased.—The Ven. Archdeacon Meredith sent leaves of a Poplar with large golden-yellow areas upon them, occupying in some cases half the leaf surface, due to the fructification of *Ascomyces aureus*, a fungus nearly allied to the one producing leaf-curl in Peaches. One or two of the leaves showed on their upper surfaces the silvery appearance characteristic of the attack of *Stereum purpureum* as seen in Plums.

Liparis lacerata.—Mr. J. O'Brien showed an inflorescence of *Liparis lacerata* (Ridley, in *Journ. Linn. Soc.* xxii. 1886, p. 284. Malay Peninsula, Perak, &c., Dist. Tenasserim, Borneo). A small example is represented in Burbidge's drawings of Borneo plants in the Natural History Museum. The species was little known until it flowered with the Hon. N. Charles Rothschild, and was noted in the "Gardeners' Chronicle," February 15, 1913, p. 99, from a plant sent to him by a collector in Borneo. The present specimen, flowering with Sir Marcus Samuel, was obtained from the same source. Some of the flowers had dropped, but the spike was about nine inches in length.

Robinia Pseudacacia monophylla.—Mr. E. A. Bowles showed flowers

of the variety of *Robinia Pseudacacia* called *monophylla*, obtained in a garden in Italy. It is characterized by the very large terminal leaflet and pair of small ones below it. All the flowers he had examined had two or three carpels, but seed was being produced.

Progeny of Green Wallflower.—Mr. F. J. Clittenden, F.L.S., referred to the Wallflower cross, the F₁ generation of which was shown to the Committee last season (JOURNAL R.H.S., xxxviii. p. xxxix). The original cross was between a "green-flowered" form and the normal form, and in the first generation all the flowers produced in many plants were normal. The self-fertilized seedlings from these plants had in some cases flowered this season, but in insufficient numbers to give any reliable statistics. The results, so far, showed, however, that segregation was occurring, several of the plants producing the "green" abortive flowers, and others the normal flowers. The plants are being grown on.

SCIENTIFIC COMMITTEE, JULY 29, 1913.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and thirteen members present, with Mr. A. D. COTTON, F.L.S., a visitor.

Plum-boring Moth.—Mr. E. M. Holmes, F.L.S., showed examples of the work of the larvæ of this moth, and commented upon the damage done and the differences he had observed (particularly in the amount of spotting) in the larvæ in life and as described.

Hybrid Pelargoniums.—Mr. A. Langley Smith showed a number of variations obtained from self-fertilizing the plant obtained as a result of crossing *P. crispum* with an old hybrid fancy called 'The Shah,' and by recrossing the forms among themselves. 'The Shah' is a fancy Pelargonium sent out many years ago by Messrs. Turner, of Slough; its origin is unknown, as Messrs. Turner tell us (*in litt.*). A summary of the results is given below.

Group A: Original Hybrid (*Pelargonium crispum* × *P.* × 'The Shah'), self-pollinated.

- „ B: Original Hybrid × Fancies.
- „ C: Fancies × Original Hybrid.
- „ D: Group C seedlings—self-pollinated.
- „ E: Group B seedlings × Group C seedlings.
- „ F: Group C seedlings × Group B seedlings.
- „ G: Group C seedlings × Fancies.
- „ H: Fancies × Group C seedlings.

The terms tall, intermediate, and dwarf have the following significance:—

Tall: Tall upright habit, few branches.

Intermediate: Semi-drooping bushy habit, fairly tall.

Dwarf: Dwarf bushy habit, stiff stems.

CXX PROCEEDINGS OF THE ROYAL HORTICULTURAL SOCIETY.

				A.							B.		
		Leaves.			Scented.			Not Scented			Leaves.		
		L	M	S	L	M	S	L	M	S	L	M	S
Tall	Entire .	5	1	3	2	..	..	Tall	Entire .	..	2	..	..
	Lobed .	3	7	4	2	1	1		Lobed .	..	1	..	1
	Deeply cut .	2	3	1	1	4	0		Deeply cut .	..	..	..	..
Inter-mediate	Entire .	..	..	1	..	..	1	Inter-mediate	Entire .	..	1	..	..
	Lobed .	..	..	..	..	..	..		Lobed .	..	1	..	..
	Deeply cut .	..	..	1	..	..	..		Deeply cut .	..	..	..	..
Dwarf	Entire .	..	3	2	..	3	..	Dwarf	Entire .	..	..	..	1
	Lobed .	..	7	2	..	6	..		Lobed .	..	..	1	..
	Deeply cut .	1	3	..	..	1	1		Deeply cut .	..	..	..	1

				C.							D.		
Tall	Entire .	..	..	..	..	..	Tall	Entire .	..	2	..	1	..
	Lobed .	..	..	..	..	..		Lobed .	..	..	..	2	..
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..
Inter-mediate	Entire .	..	1	..	..	..	Inter-mediate	Entire .	..	1	1	..	..
	Lobed .	..	1	..	..	1		Lobed .	1	1	..	..	2
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..
Dwarf	Entire .	..	..	..	..	6	Dwarf	Entire .	..	1	1	..	..
	Lobed .	..	1	..	..	3		Lobed .	..	1	..	..	4
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	1	..	..	1

				E.							F.		
Tall	Entire .	..	..	..	..	..	Tall	Entire .	..	..	..	..	2
	Lobed .	1	..	..	..	..		Lobed .	..	1	..	..	..
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..
Inter-mediate	Entire .	..	..	..	..	..	Inter-mediate	Entire .	..	..	..	..	..
	Lobed .	..	..	..	..	..		Lobed .	..	..	..	..	2
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..
Dwarf	Entire .	1	..	..	..	..	Dwarf	Entire .	..	..	..	..	..
	Lobed .	..	..	..	..	..		Lobed .	..	1	..	1	1
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..

				G.							H.		
Tall	Entire .	..	..	..	1	..	Tall	Entire .	..	..	..	1	6
	Lobed .	..	1	..	..	..		Lobed .	..	1	..	1	..
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..
Inter-mediate	Entire .	..	1	..	..	..	Inter-mediate	Entire .	..	..	..	..	..
	Lobed .	..	..	..	..	1		Lobed .	..	..	..	..	..
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..
Dwarf	Entire .	..	..	..	2	..	Dwarf	Entire .	..	..	..	..	..
	Lobed .	..	..	..	..	1		Lobed .	..	..	..	..	..
	Deeply cut .	..	..	..	..	..		Deeply cut .	..	..	..	..	..

L = large leaves. M = medium-sized leaves. S = small leaves.

A Certificate of Appreciation was recommended to Mr. Smith for his work with these Pelargoniums.

SCIENTIFIC COMMITTEE, AUGUST 12, 1913.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and six members present, with Mr. R. FARRER, a visitor.

Agapanthus inapertus syn. *A. Weillighi* Hort.—Mr. A. Worsley showed a specimen of this beautiful species of *Agapanthus*, which he had obtained from Holland. It is fully described at p. 363.

Double Cineraria.—Mr. Worsley also showed heads of a *Cineraria* with proliferation similar to that seen in the 'Hen and Chickens' Daisies, but with the separate capitula more congested. He remarked that this type of doubling often occurred in forms that normally bear single flowers when they blossom in summer, as in the present instance, and that the normal type would be resumed later on.

Saxifraga florulenta.—This curious species of *Saxifraga* was sent by Mr. Chaplin, of Great Amwell, Ware, in whose garden it had flowered. It was collected by him and had apparently been growing in shade in cultivation, though it appears to grow alike in sun and shade in its home in the Maritime Alps, where it occurs at high altitudes. It has perhaps only once before flowered in this country, when it was shown by Maw and received a first-class certificate in June 1872. Its foliage is more attractive than its flowers.

Rubus discolor double-flowered.—Mr. Chittenden showed from a correspondent at Haywards Heath a beautiful pink-flowered form of the common bramble with double flowers. It had been found in a hedge and was apparently wild. Several such forms are in cultivation.

Xanthorrhoea australis.—Mr. E. M. Holmes, F.L.S., showed the lower part of the leaf-rosette of this plant, which is now being imported for cattle food on account of the sugar it contains.

Aphis on Picea.—Some shoots of the *Picea pungens glauca* and *P. magnifica* were sent from Lexden attacked by the large aphis which has been so prevalent this year and last on these trees in several parts of the country, and has worked great damage to them. Mr. Chittenden said that several trees had been attacked at Wisley, but the insects had all been killed by one thorough spraying with "Niquas" in May, and the trees had quite regained their beauty. The winter is passed in the egg stage, and spraying should be resorted to as soon as the insects hatch out in spring, any wash containing nicotine being useful.

Apples showing Glassiness.—Some specimens of the apple 'Lord Derby' were sent from South Devon from some cordon trees, and showed the curious phenomenon known as glassiness in a marked manner. The cause leading to this peculiar condition is so far unknown, though it is often attributed to frost. It is evident that

in this and in several similar cases that have recently come to notice this cause cannot have been acting.

Crown Gall.—Mr. H. T. Güssow sent a culture of the *Bacterium tumefaciens* which Dr. Erwin Smith has shown to be the cause of the disease known as crown gall. This disease attacks numerous plants, producing large swellings, generally of a soft nature, on the roots and lower parts of the stems, and in America it is frequently credited with doing damage to the plants attacked. The Committee would be glad to learn whether any serious results have followed the occurrence of such swellings on the roots of plants. Instances have been brought to the notice of the Committee of swellings on Apple, Plum, Birch, Cherry, Peach, Carnation, Marguerite, Blackberry, Loganberry, and Cupressus.

SCIENTIFIC COMMITTEE, AUGUST 26, 1913.

Mr. E. A. BOWLES, M.A., F.L.S., F.E.S., in the Chair, and seven members present.

Mr. Chittenden reported that the Violet leaves sent by Mr. Druery were attacked by the gall midge, *Cecidomyia violae*.

Double Gladioli.—A letter from Col. Sandeman was read in connexion with the alleged doubling of Gladioli. As no specimen came with the letter, the Committee could not decide the point raised. Incidentally, Dr. Bateson remarked that if the fact were established it would be interesting, as there were several families or orders, such, for example, as the Labiatae, that, although having peloric forms, do not show true doubling of the flower.

Campanula Disease.—Mr. Edwards, of Sylfaen Gardens, Welshpool, sent leaves of *Campanula persicifolia* affected with *Puccinia Campanulae* (Plowright and Berkeley).

Late Brood of Sawfly.—Mr. Edwards also sent a brood of the Sawfly (Gooseberry) caterpillar, *Nematus ribesii*. The Committee thought this should be recorded owing to the very late period of hatching.

Matricaria suaveolens = *M. discoidea*.—Mr. Odell showed this little Composite from N.-W. Middlesex. It is a recent immigrant to this country, and has been recorded by Mr. E. Bowles from Essex and Hertfordshire, and by Mr. J. Fraser from Aberdeen.

Fasciated Aloysia citriodora.—Mr. Odell showed stems of this plant fasciated, and having a very mixed phyllotaxis, with the terminal parts showing the normal terete stem and normal phyllotaxis. Dr. Bateson remarked that the condition was similar to that of the Crown Pea, *Pisum umbellatum*, where from a densely fasciated stem normal shoots were developed with flowers.

FRUIT AND VEGETABLE COMMITTEE.

MAY 14, 1913.

Mr. J. CHEAL in the Chair, and five members present.

No awards were recommended on this occasion.

Exhibits.

W. Arkwright, Esq. (gr. Mr. Stephenson), Chesterfield : Nectarine 'Early Rivers.'

C. H. Paynter, Esq., St. Buryan : Tomatos.

FRUIT AND VEGETABLE COMMITTEE, JUNE 3, 1913.

Mr. A. H. PEARSON, J.P., V.M.H., in the Chair, and nine members present.

Award Recommended :—*Silver Banksian Medal.*

To Messrs. Carter, Raynes Park, for Lettuces.

Other Exhibit.

Rt. Hon. Earl of Denbigh, Lutterworth : Tomatos.

FRUIT AND VEGETABLE COMMITTEE, JUNE 17, 1913.

Mr. J. CHEAL in the Chair, and sixteen members present.

Awards Recommended :—*Gold Medal.*

To Messrs. J. Veitch, Chelsea, for Vegetables.

Bronze Banksian Medal.

To Messrs. Dobbie, Edinburgh, for Cabbages.

Cultural Commendation.

To Mr. A. E. Course, Biggleswade, for Asparagus.

Other Exhibit.

Mr. S. Mortimer, Farnham : Cucumber 'Continuity.'

FRUIT AND VEGETABLE COMMITTEE, JUNE 24, 1913.

SUB-COMMITTEE AT WISLEY.

Mr. J. CHEAL in the Chair, and six members present.

The Sub-Committee inspected the trials and selected the following for presentation to the full Committee, making the following recommendations as to awards :—

First-class Certificate.

To Strawberry 'Connoisseur.'

Award of Merit.

To Peas :—No. 92. 'King of the Dwarfs.'
 No. 163. 'Superb.'
 No. 175. 'The Pilot,' A.M. July 3, 1903.
 No. 197. No. 3879

Highly Commended.

To Peas :—No. 84. 'Hundredfold,' A.M. July 5, 1910.
 No. 153. 'Snowdrop,' F.C.C. Aug. 30, 1883.

FRUIT AND VEGETABLE COMMITTEE, JULY 1, 1913.

AT HOLLAND HOUSE.

Mr. W. POUPART in the Chair, and seventeen members present.

[For Cups and Medals awarded by the Council, see p. cii].

Awards Recommended :—

First-class Certificate.

To Strawberry 'Connoisseur,' from Messrs. Laxton, Bedford.

Award of Merit.

To Pea 'King of the Dwarfs,' from Messrs. Sutton, Reading.
 To Pea 'Superb,' from Messrs. Laxton, Bedford.
 To Pea 'No. 3879,' from Messrs. Hurst, Houndsditch.
 For descriptions see Reports of trials at Wisley, 1913.

Cultural Commendation.

To Messrs. Pither, Uxbridge, for Mushroom 'Bide's Market.'

Other Exhibits.

Messrs. Laxton, Bedford : Peach 'Laxton's Advance.'
 Messrs. Seabrook, Chelmsford : Black Currant 'Seabrook's Black.'
 H. P. Sturgis, Esq., Leatherhead : Strawberry 'Peter's Olympia,'
 A.M. 1911.

FRUIT AND VEGETABLE COMMITTEE, JULY 7, 1913.

SUB-COMMITTEE AT WISLEY.

Mr. W. POUPART in the Chair, and two members present.

The Sub-Committee inspected the trials and selected the following for presentation to the full Committee, making the following recommendations as to awards :—

First-class Certificate.

To Strawberry 'British Queen.'

Award of Merit.

To Strawberry 'Cropper.'
 To Strawberry 'Fillbasket,' A.M. July 23, 1907.

To Strawberry 'Progress.'

To Strawberry 'Rival.'

To Peas:—Nos. 3, 4. 'Alderman,' **F.C.C.** July 10, 1900.
 No. 59. 'Exhibition,' **A.M.** Aug. 16, 1910.
 No. 62. 'Favourite.'
 No. 115. 'Masterpiece.'
 No. 134. 'Premier,' **A.M.** July 18, 1911.
 No. 142. 'Quite Content,' **F.C.C.** Aug. 14, 1906.
 No. 152. 'Sir Arthur Bignold.'
 No. 185. 'Warriston Wonder.'

Highly Commended.

To Peas:—No. 5. 'America,' **A.M.** July 18, 1911.
 No. 9. 'Battleship.'
 No. 13. 'Best of All.'
 No. 31. 'Discovery.'
 No. 83. 'Harvestman,' **A.M.** June 30, 1908.
 No. 88. 'International,' **A.M.** June 30, 1908.
 No. 98. 'Laxtonian,' **A.M.** July 5, 1910.
 No. 105. 'Magnum Bonum,' **A.M.** Aug. 16, 1910.
 No. 112. 'Marquis of Stafford.'
 No. 127. 'Peerless,' **F.C.C.** July 14, 1903.
 No. 140. 'Prodigy,' **F.C.C.** July 10, 1885.
 No. 171. 'The Clipper.'
 No. 179. 'Up to Date.'
 No. 184. 'Victor,' **A.M.** July 5, 1910.
 No. 212. 'Orwell.'

Commended.

To Pea:—No. 85. Ideal, **F.C.C.** July 3, 1903.

FRUIT AND VEGETABLE COMMITTEE, JULY 15, 1913.

Mr. G. BUNYARD, V.M.H., in the Chair, and sixteen members present.

Awards Recommended:—

Gold Medal.

To Messrs. J. Veitch, Chelsea, for fruit trees in pots.

Silver Knightian Medal.

To Lady Wernher (gr. Mr. Metcalfe), Luton, for Strawberries.

Cultural Commendation.

To W. J. Sanderson, Esq., Warkworth, for Strawberry 'Bedford Champion.'

The following awards were made to produce after trial at Wisley.
 For descriptions see Reports of trials.

First-class Certificate.

To Strawberry 'British Queen,' from R.H.S. Gardens, Wisley.

Award of Merit.

To Strawberry 'Cropper,' from Messrs. Laxton, Bedford.
 To Strawberry 'Progress,' from Messrs. Laxton, Bedford.
 To Strawberry 'Rival,' from Messrs. Laxton, Bedford.
 To Pea 'Favourite,' from Messrs. J. Veitch, Chelsea.
 To Pea 'Masterpiece,' from Messrs. Sutton, Reading.
 To Pea 'Sir Arthur Bignold,' from Mr. W. G. Holmes, Tain.
 To Pea 'Warriston Wonder,' from Messrs. Bell & Bieberstedt, Leith.

Highly Commended.

Pea 'Battleship,' from Messrs. Carter, Raynes Park.
 Pea 'Best of All,' from Messrs. Wheeler, Gloucester.
 Pea 'Discovery,' from Messrs. Dickson, Newtownards.
 Pea 'Marquis of Stafford,' from Mr. W. G. Holmes, Tain.
 Pea 'The Clipper,' from Messrs. R. Sydenham, Birmingham.
 Pea 'Up to Date,' from Messrs. Sutton, Reading.
 Pea 'Orwell,' from Mr. R. Staward, Hertford.

Other Exhibits.

Lady Egerton, Thame: Strawberry 'The Laxton.'
 A. Faulknor, Esq., Hungerford: Seedling Raspberry.
 Hon. Vicary Gibbs, Elstree: Beetroot 'Veitch's New Intermediate.'
 T. Meredith, Esq., Coventry: curious specimen of Kale.

FRUIT AND VEGETABLE COMMITTEE, JULY 21, 1913.

SUB-COMMITTEE AT WISLEY.

Mr. W. POUPART in the Chair, and four members present.

The Sub-Committee inspected the trials and selected the following for presentation to the full Committee, making the following recommendations as to awards:—

Award of Merit.

To Pea No. 25. 'Daisy.'
 To Pea No. 83. 'Harvestman,' A.M. June 30, 1908.
 To Pea No. 88. 'International,' A.M. June 30, 1908.
 To Pea No. 184. 'Victor,' A.M. July 5, 1910.
 To Turnip No. 57. 'Early Snowball.'
 To French Bean. 'Perpetual.'
 To French Bean. 'Sunrise.'

Highly Commended.

To Pea No. 102. 'Little Marvel,' A.M. July 11, 1902.
 To Pea No. 151. 'Seedling.'

- To Turnip No. 1. 'All the Year Round.'
 To Turnip No. 4. 'Covent Garden Snowball.'
 To Turnip No. 7. 'Criterion.'
 To Turnip No. 27. 'Milan, Extra Early,' F.C.C. June 12, 1883.
 To Turnip No. 31. 'Milan, White.'
 To Turnip No. 32. 'Milan, Red Top Early.'
 To Turnip No. 43. 'Model White Stone.'
 To Turnip No. 47. 'Manchester Market.'
 To Turnip No. 53. 'Red Globe.'
 To Potato No. 14. 'Western Hero.'
 To Potato No. 18. 'Surprise.'

FRUIT AND VEGETABLE COMMITTEE, JULY 29, 1913.

Mr. A. H. PEARSON, J.P., V.M.H., in the Chair, and six members present.

Awards Recommended :—

Silver Knightian Medal.

To Lady Wernher (gr. Mr. Metcalfe), Luton, for Melons and Grapes.

Cultural Commendation.

To Leopold de Rothschild, Esq., C.V.O. (gr. Mr. J. Hudson, V.M.H.), Acton, for a pot-grown tree of Fig 'Bourjassote Grise.'

All the following awards were made to produce tried at Wisley. For descriptions see Reports of Trials.

Award of Merit.

To French Bean 'Perpetual,' from Messrs. Carter, Raynes Park.

To French Bean 'Sunrise,' from Messrs. Carter, Raynes Park.

To Turnip 'Early Snowball,' from Messrs. Sutton, Reading.

Highly Commended.

Pea 'Seedling,' from Messrs. Sutton, Reading.

Potato 'Surprise,' from Messrs. Carter, Raynes Park.

Potato 'Western Hero,' from Messrs. R. Veitch, Exeter.

Turnip 'All the Year Round,' from Messrs. Carter, Raynes Park.

Turnip 'Milan (White),' from Messrs. Carter, Raynes Park.

Turnip 'Milan (Red-top Early),' from Messrs. Carter, Raynes Park.

Turnip 'Covent Garden Snowball,' from Messrs. Barr, Taplow.

Turnip 'Criterion,' from Messrs. Sutton, Reading.

Turnip 'Model White Stone,' from Messrs. Sydenham, Birmingham.

Turnip 'Manchester Market,' from Messrs. Sharpe, Sleaford.

Turnip 'Red Globe,' from Messrs. J. Veitch, Chelsea.

Other Exhibits.

H. Chapman, Esq., Rye : Vegetable Marrows.

Mr. A. Faulknor, Hungerford : Raspberries.

FRUIT AND VEGETABLE COMMITTEE, AUGUST 12, 1913.

Mr. G. BUNYARD, V.M.H., in the Chair, and thirteen members present.

Award Recommended :—

Silver-gilt Knightian Medal.

To Messrs. J. Veitch, Chelsea, for fruit trees in pots.

Other Exhibits.

Mr. A. Faulknor, Hungerford : Raspberry 'Inkpen Prolific.'

Mr. J. Miles, Erith : Raspberries.

Mr. W. Profitlich, Twickenham : Blackberries.

Messrs. Whitelegg and Page, Chislehurst : Tomato 'The Cropper.'

FRUIT AND VEGETABLE COMMITTEE, AUGUST 22, 1913.

SUB-COMMITTEE AT WISLEY.

Mr. J. CHEAL in the Chair, and eight members present.

Awards Recommended :—

Award of Merit.

To Potato No. 27. 'Irish King.'

To Tomato No. 42. 'Holme's Ideal.'

To Tomato No. 43. 'Holyrood.'

To Tomato No. 44. 'Hurst Marvel.'

To Tomato No. 47. 'Liberty.'

To Tomato No. 48. 'Lightning.'

To Tomato No. 68. 'Pear-shaped.'

Highly Commended.

Potato No. 30. 'Great Scot,' A.M. Sept. 26, 1911.

Potato No. 41. 'Seedling, No. 28.'

Potato No. 58. 'Southern Star,' A.M. Nov. 21, 1905.

Tomato No. 34. 'Garland.'

Tomato No. 39. 'Golden Sunrise.'

FRUIT AND VEGETABLE COMMITTEE, AUGUST 26, 1913.

Mr. G. BUNYARD, V.M.H., in the Chair, and sixteen members present.

Awards Recommended :—

Silver-gilt Knightian Medal.

To Messrs. Baker, Wolverhampton, for vegetables.

Silver-gilt Banksian Medal.

To Messrs. Bunyard, Maidstone, for fruit.

Silver Knightian Medal.

To Messrs. Spooner, Hounslow, for Apples.

Bronze Banksian Medal.

To C. E. Baring Young, Esq. (gr. Mr. Walker), East Barnet, for fruit.

Award of Merit.

To Apple 'Maidstone Favourite' (votes, unanimous), from Messrs. Bunyard, Maidstone. Fruit of medium size, perfectly shaped, flattish; skin almost entirely coloured with red spots; eye partly open, with slightly incurved segments set in a shallow, even basin. Stalk half an inch long, inserted in a rather deep russety cavity. Flesh white, soft, juicy, and of pleasant flavour. Tree of sturdy habit and a good bearer. It should prove a valuable market apple for dessert, as it comes into use between 'Beauty of Bath' and 'Worcester Pearmain.' It is a seedling from 'Emperor Alexander' probably crossed with 'Beauty of Bath,' which it somewhat resembles in appearance, but it is larger and later. (Fig. 143.)

To Potato 'Irish King' (votes, unanimous), from Messrs. Barr, Covent Garden, W.C. For description see report of Wisley trial.

Highly Commended.

Potato 'Raynes Park White,' from Messrs. Carter, Raynes Park.

Tomato 'Garland,' from Messrs. Dobbie, Edinburgh.

Tomato 'Golden Sunrise,' from Messrs. Carter, Raynes Park.

Tomato 'Holme's Ideal,' from Messrs. Sydenham, Birmingham.

Tomato 'Holyrood,' from Messrs. Dobbie, Edinburgh.

Tomato 'Hurst Marvel,' from Messrs. Drover, Hurstpierpoint.

Tomato 'Liberty,' from Messrs. A. Dickson, Newtownards.

Tomato 'Lightning,' from Messrs. Barr, Covent Garden.

Tomato 'Pear-shaped,' from Messrs. Barr, Covent Garden.

For descriptions of the above see Reports of Wisley Trials.

Other Exhibits.

Messrs. Bucks, Ipswich: Tomato 'Bucks' Tresco.'

FLORAL COMMITTEE.

MAY 14, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Dobbie, Edinburgh, for Sweet Peas, Violas, &c.

To Messrs. Mount, Canterbury, for Roses.

Silver-gilt Banksian Medal.

To Messrs. Cutbush, Highgate, for Carnations, Roses, &c.

Silver Flora Medal.

To Mrs. Lloyd Edwards, Llangollen, for Saxifrages.

To Mr. G. Reuthe, Keston, for flowering shrubs and alpine.

To Messrs. J. Veitch, Chelsea, for Cape Pelargoniums and Auriculas.

Silver Banksian Medal.

To Messrs. B. R. Cant, Colchester, for Roses.

To Mr. C. Engelmann, Saffron Walden, for Carnations.

To Mr. H. Hemsley, Crawley, for hardy plants.

To Mr. P. Ladds, Swanley, for miscellaneous flowering plants.

To Messrs. S. Low, Bush Hill Park, for Carnations.

To Messrs. May, Upper Edmonton, for ferns and flowering plants.

To Messrs. G. Paul, Cheshunt, for flowering shrubs.

To Mr. C. Turner, Slough, for Caladiums, &c.

Bronze Flora Medal.

To Messrs. Cheal, Crawley, for rock plants and shrubs.

To Messrs. Fells, Letchworth, for hardy plants.

To Colonel Sir Mark Lockwood (gr. Mr. Craddock), Romford, for Schizanthus.

To Messrs. Reamsbottom, Geashill, for Anemones.

To Wargrave Plant Farm, Liverpool Street, for rockery.

To Messrs. Whitelegg and Page, Chislehurst, for Violas.

Bronze Banksian Medal.

To Messrs. Carter Page, London Wall, for Violas and Annuals.

First-class Certificate.

To Pæony 'La Lorraine' (votes, unanimous), from Messrs. Piper, Bayswater. A remarkable hybrid between *P. lutea* and *P. Moutan* 'Princess Elizabeth.' The foliage is glaucous and resembles that of the latter parent. The flowers are large, and measure 6 inches across.

They are very full and double, and are of a pale sulphur-yellow colour, with crimson markings at the base of the petals. Messrs. Lemoine, of Nancy, are the raisers, and the plant is said to be a robust grower.

Award of Merit.

To *Aster Purdomii* (votes, 10 for, 4 against), from Messrs. J. Veitch, Chelsea. A very pretty and perfectly hardy species, introduced from the mountains of Tai-pei-shan, Shensi, North China, by Mr. Purdom. The solitary flowers, which somewhat resemble those of *A. alpinus*, are borne very freely, and are of a pale rose-violet colour, with a pale yellow centre. They measure about $2\frac{1}{2}$ inches across. The radical leaves are ovate-elliptic, hairy, and have two or three marginal teeth. The height of the plant is about 9 inches.

To Carnation 'Lady Ingestre' (votes, 8 for, 3 against), from Messrs. Cutbush, Highgate. A perpetual-flowering variety, having large and very double flowers of excellent form, and of a charming shade of salmon pink. The edges of the petals are prettily crinkled, and the plant is a strong grower.

To Heliotrope 'The Speaker' (votes, 13 for, 3 against), from Mr. P. Ladds, Swanley. A dark-coloured seedling having large trusses of very sweetly scented flowers. It is very compact and bushy in habit.

To *Rhododendron* 'Rose Queen' (votes, unanimous), from Miss Clara Mangles, Littleworth, Seale, Surrey. A lovely hybrid, having rose-pink funnel-shaped flowers, tinged with orange at the base of the tube. They are scented, borne in trusses of seven or eight, and measure nearly 3 inches across when fully open. The leaves are lanceolate in shape.

To *Rhododendron Wightii* (votes, unanimous), from Miss Clara Mangles, Littleworth, Seale, Surrey. A remarkable *Rhododendron*, bearing clusters of about a score of bell-shaped flowers at the ends of the shoots. The flowers are pale sulphur-yellow in colour, with crimson markings at the base, and are borne on pedicels 4 inches long. The leaves are lanceolate, dark green above, and covered with a brown tomentum beneath.

To Rose 'Miss Flora Mitten' (votes, unanimous), from Mr. J. Elliott, Hassocks. A charming climbing variety, bearing numerous large, single flowers, of a delicate pink colour. It was raised by the late Mr. W. Mitten, of Hurstpierpoint, and it is believed to be a seedling from *R. Brunonii*. It is a strong grower, and blooms over a long period, first on the laterals, and later on the sub-laterals.

To *Thunbergia Gibsonii* (votes, unanimous), from W. Van de Weyer, Esq., Smedmore House, Corfe Castle, Dorset. A very striking plant from the open plains of British East Africa, where the temperature ranges from 40°–80° F. The flowers measure $1\frac{1}{2}$ inch across, and are of an uncommon and beautiful shade of Chinese orange (shade 4, "Répertoire de Couleurs"). They are axillary, on pedicels about 4 inches long, and have large, curiously inflated and keeled

calyces, blotched with chocolate-brown. The leaves are opposite, ovate-lanceolate, cordate at the base, and, like the calyces and stems, are covered with hairs. The plant is prostrate in habit.

Other Exhibits.

Messrs. Baker, Codsall : rockery.

Mr. W. Baxter, Plumstead : Pelargonium 'Cotswold.'

Messrs. Clark, Dover : hardy plants.

Miss Dixon, Edenbridge : Lilies and Myosotis.

Messrs. Goos and Koenemann, Rheingau, Germany : Irises.

Mr. W. Hay, Hexham : Roses.

Mr. E. J. Hicks, Twyford : Roses.

Misses Hopkins, Shepperton : hardy plants.

Mary, Countess of Ilchester, South Kensington : *Petrea volubilis* and *Mackaya bella*.

Sir Trevor Lawrence, Bt., Dorking : Lilac 'Léon Gambetta.'

Miss N. Lucas, Hale : Myosotis 'Royal Blue Improved' and *Viola gracilis* 'Primrose.'

Mr. G. W. Miller, Wisbech : Violas, &c.

Mr. H. Robertson, Dundee : Wallflower 'Golden Dawn.'

Messrs. Ware, Feltham : rockery.

Messrs. Wells, Merstham : Carnations.

Miss E. Willmott, V.M.H., Great Warley : Tritonias.

FLORAL COMMITTEE, MAY 20, 1913.

AT CHELSEA.

Mr. H. B. MAY, V.M.H., in the Chair, and nineteen members present.

[For awards of Cups and Medals made by the Council after consultation with the Judges, see p. xciv.]

Awards Recommended :—

First-class Certificate.

To *Cupressus Lawsoniana Fletcheri* (votes, 14 for), from Messrs. Fletcher, Bros., Ottershaw Nursery, Chertsey. A very distinct sport from the type, having a very dense, bushy, and erect habit of growth. It branches freely and has greyish foliage. The specimens were about 18 inches high and admirably adapted for the rock garden. (Fig. 144.)

To *Meconopsis Delavayi* (votes, unanimous), from the Regius Keeper, Botanic Garden, Edinburgh. A charming plant, about 5 inches high, having large, solitary, pendent flowers of a deep violet-purple colour. The big bunch of golden anthers forms a pleasing contrast. The leaves are ovate-lanceolate, pale green above and glaucous beneath.

To *Nephrolepis exaltata Willmottae* (votes, unanimous), from Messrs. May, Upper Edmonton. This fern received an Award of Merit, November 5, 1912. It has very finely divided, densely plumose fronds, and is more moss-like than *N. exaltata Marshallii compacta*.



FIG. 143.—APPLE 'MAIDSTONE FAVOURITE.' (*Garden.*) (p. cxxix.)

[To face p. cxxxii.]



FIG. 144.—*CUPRESSUS LAWSONIANA FLETCHERI*. (*Gardeners' Magazine*.)
(p. cxxxii.)



FIG. 145.—*CAMPANULA STEVENII NANA*. (*Garden.*) (p. cxxxiii.)



FIG. 146.—*ROSCOEA CAUTLIOIDES* (Bees.) (p. cxxxiii.)

[To face p. cxxxiii.]

Award of Merit.

To *Aster Falconeri* (votes, unanimous), from Messrs. Barr, 11 King Street, Covent Garden. A useful hardy plant for the rock garden. It grows about 1 foot high and produces large flowers, of which the ray florets are violet-mauve and the disc golden yellow. The leaves are lanceolate and sessile, and are covered with hairs.

To *Auricula* 'William Smith' (votes, 8 for), from Mr. J. Douglas, Great Bookham. A fine green-edged variety, having a perfect pure white paste, surrounded by a zone of dark brownish colour. The individual flowers are large, and they are borne in a fine truss.

To *Begonia* 'Lena' (votes, 10 for, 5 against), from Messrs. Blackmore and Langdon, Twerton-on-Avon, Bath. A beautiful carmine-rose hybrid variety for growing in baskets. The flowers are semi-double and have long pointed petals. They are very freely produced, and hang down over the sides of the basket. The leaves are long and narrow, and irregularly serrated.

To *Calceolaria* 'Clarefield Gem' (votes, 12 for, 1 against), from Mrs. Litkie (gr. Mr. Hulbert), Clarefield, Pinkneys Green. This charming hybrid is the result of a cross between *C. profusa* type, and the herbaceous *Calceolaria*. It has the tall growth and free-branching habit which are characteristic of *C. Clibranii*, but the flowers are larger and are borne more closely on the stem. The pouch is circular, and has a yellow ground-colour, shaded with orange and spotted with crimson.

To *Campanula Stevenii nana* (votes, unanimous), from Mr. R. Prichard, West Moors. A lovely plant for the rockery, forming a dense carpet of small linear leaves, above which arise the comparatively large mauve flowers. The pedicels are very short, and rarely exceed 2 inches in length. The colour of the flowers is rather deeper than that of the type, and the blossoms are very open. The plant is free-flowering, quite hardy, and one of the first Campanulas to flower. (Fig. 145.)

To *Cytisus Andreanus prostratus* (votes, 11 for), from Mr. L. R. Russell, Richmond. A pendent form of this well-known shrub. The flowers are large and yellow, with chestnut-red wings. The specimen exhibited was shown as a weeping standard.

To *Lonicera tragophylla* (votes, 9 for), from Messrs. J. Veitch, Chelsea. A new Chinese species, of twining habit. The flowers are deep lemon-yellow, and the corolla tube measures $2\frac{3}{4}$ inches long. The leaves are elliptic, with pinkish midribs. The upper pair of leaves are connate.

To *Pentstemon Davidsonii* (votes, unanimous), from Mr. C. Elliott, Stevenage. A very free-flowering hardy moraine plant, of prostrate growth, from the Rocky Mountains. The flowers are deep rose, and the tube measures about $1\frac{1}{4}$ inch long. The leaves are small, round, and serrate.

To *Roscoea cautlioides* (votes, 11 for), from Messrs. Bees, Ltd., Liverpool. A very pretty plant from China, which has proved hardy in the nurseries of the exhibitors. The flowers are pale sulphur-

yellow, and have the upper petals hooded, while the broad frill gives an Iris-like appearance. The plant grows about 1 foot high, and the lanceolate leaves clasp the flower stem. (Fig. 146.)

To Rose 'Irish Fireflame' (votes, 11 for, 1 against), from Messrs. Alex. Dickson, Newtownards, Ireland. A charming single Rose like 'Irish Elegance' in form, but having the beautiful long buds of a rich coppery-orange colour, changing to apricot when the flower is fully open. It is a free and perpetual flowering variety, and the dark, glossy, green foliage forms a pleasing background to the lovely colour of the blooms.

To Rose 'Mrs. Campbell Hall' (votes, unanimous), from Messrs. Alex. Dickson, Newtownards, Ireland. A very fine 'Tea' Rose, of large size and wonderful substance. It is creamy white in colour, prettily suffused with pink, especially in the bud state. It is pleasantly scented.

To Rose 'Nancy Perkins' (votes, unanimous), from Messrs. T. Perkins, Northampton. A very dwarf white Polyantha Rose, of exceedingly free-flowering habit. The flowers measure about 1 inch across, and are very double. They have a pleasing scent. The plants exhibited were about 1 foot high.

To Rose 'White Tausendschön' (votes, 14 for, 3 against), from Messrs. W. Paul, Waltham Cross. This is a good Rambler, similar in habit, foliage, vigour, and size of flower to 'Tausendschön,' from which it is a sport. The flowers are white, delicately tinted with pink in the bud state. They are borne very freely in large clusters.

To *Sarracenia Brucei* (votes, unanimous), from Mr. A. J. A. Bruce, Chorlton-cum-Hardy. A very handsome variety, having a long, gradually tapering trumpet, veined in the upper half with crimson. The pitcher has a large lid with frilled margins. The flowers are green and the reverse of the sepals shaded crimson.

To *Saxifraga Grandfieldii* (votes, 8 for, 4 against), from Sir Everard Hambro, K.C.V.O. (gr. Mr. Grandfield), Hayes, Kent. A fine encrusted variety, of garden origin, bearing spikes of pure white flowers. The leaves are serrated and arranged in rosettes, from which the flower spikes arise. The stems and pedicels are covered with hairs. The plant is about 1 foot high. The specimen exhibited was growing in a 6-inch pan, and carried eleven spikes of fully-expanded flowers.

To *Styrax Wilsonii* (votes, unanimous), from Miss Willmott, F.L.S., V.M.H. (gr. Mr. Fielder, V.M.H.), Great Warley. A very graceful Chinese shrub, of dwarf habit. The twigs are wiry, and carry small ovate-lanceolate leaves having a few irregular notches. The flowers are white, pendulous, freely borne, and have prominent cream anthers. It possesses a similar degree of hardiness to that of *S. japonicum*.

Botanical Certificate.

To *Olearia chathamica* (votes, unanimous), from Rev. A. T. Boscawen, Long Rock, Cornwall. An interesting species from New

Zealand, bearing aster-like flowers nearly 3 inches across, which have the rays white, slightly shaded with mauve, and the disc violet-purple. The leaves are lanceolate, serrate, dark green above and covered with white tomentum beneath. The plant is hardy in Cornwall, and has withstood 15°-18° of frost. (Fig. 147.)

Other Exhibits.

- Messrs. Brown, Peterborough : Gaillardia 'The King.'
 Messrs. Cuthbert, Southgate : Azaleas and Tulips.
 Messrs. Dobbie, Edinburgh : Sweet Peas.
 Mr. W. Easlea, Leigh-on-Sea : Rose 'Susie.'
 Mrs. Lloyd Edwards, Llangollen : Myosotis 'Souvenir of Wm. Walton.'
 Messrs. Godfrey, Exmouth : Pelargoniums.
 Messrs. Goos and Koenemann, Rheingau, Germany : Irises.
 Mr. H. Hemsley, Crawley : hardy plants.
 Miss Hemus, Upton-on-Severn : Petunia 'Paradise Blue.'
 Messrs. Hill, Lower Edmonton : *Nephrolepis exaltata fortis*.
 Messrs. Hobbies, Dereham : Roses.
 Messrs. Kelway, Langport : Cheiranthus 'Langport Purple.'
 Messrs. E. W. King, Coggeshall : Sweet Pea 'Anglian Fairy.'
 Mr. W. Lawrenson, Yarm-on-Tees : Primula 'Yarm var.'
 Mr. W. A. Manda, St. Albans : miscellaneous plants.
 Messrs. G. Paul, Cheshunt : Azaleas.
 Messrs. Robichon, Orleans : Roses.
 Messrs. Storrie and Storrie, Glencarse : Auricula 'Creamy White' strain.
 Messrs. Sydenham, Birmingham : Sweet Pea 'Princess Mary.'
 Messrs. Thompson and Charman, Bushey : hardy plants.
 Messrs. R. Veitch, Exeter : Calceolarias.
 Messrs. Wallace, Colchester : hardy plants.
 Wargrave Plant Farm, London : *Viola gracilis* 'Lady Crisp' and Tulip 'Kathleen Moffat.'
 Messrs. Webb, Stourbridge : *Schizanthus Crooksii*.

FLORAL COMMITTEE, JUNE 3, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and thirty members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Dobbie, Edinburgh, for Sweet Peas, Antirrhinums, and Aquilegias.

To Messrs. J. Veitch, Chelsea, for Anchusas, Fuchsias, and Gloxinias.

Silver-gilt Banksian Medal.

To Messrs. Cannell, Swanley, for Cannas and Pelargoniums.

Silver Flora Medal.

- To Messrs. Bunyard, Maidstone, for hardy plants.
- To Mr. H. Burnett, Guernsey, for Carnations.
- To Messrs. B. R. Cant, Colchester, for Roses.
- To Messrs. Kelway, Langport, for hardy plants.
- To A. G. Waley, Esq. (gr. Mr. M. A. Dobson), Reigate, for Schizanthus.
- To Mr. J. D. Webster, Chichester, for Carnations.

Silver Banksian Medal.

- To Messrs. Bath, Wisbech, for Tulips and Sweet Peas.
- To Mr. C. Blick, Hayes, for Carnations.
- To Mr. J. Box, Haywards Heath, for hardy plants.
- To Messrs. Burch, Peterborough, for Roses.
- To Messrs. Clark, Dover, for hardy plants.
- To Messrs. Cutbush, Highgate, for Roses and Carnations.
- To Messrs. Gunn, Olton, for Phloxes.
- To Messrs. Jackman, Woking, for hardy plants.
- To Messrs. S. Low, Bush Hill Park, for Carnations.
- To Messrs. May, Upper Edmonton, for ferns.
- To Mr. A. Perry, Enfield, for Poppies and Irises.
- To Mr. G. Reuthe, Keston, for hardy plants.
- To Mr. L. R. Russell, Richmond, for shrubs.
- To Messrs. Wallace, Colchester, for hardy plants.

Bronze Flora Medal.

- To Messrs. Barr, Taplow, for hardy plants.
- To M. Drummond, Esq. (gr. Mr. L. Smith), Southampton, for Aquilegias.
- To Messrs. Godfrey, Exmouth, for Poppies and Pelargoniums.
- To Mr. A. Ll. Gwillim, Sidcup, for Gloxinias &c.
- To Messrs. Piper, Bayswater, for Wistarias &c.
- To Mr. M. Prichard, Christchurch, for hardy plants.
- To Messrs. Ware, Feltham, for hardy plants.

Award of Merit.

To Delphinium 'Mrs. F. Brewster' (votes, 14 for, 4 against), from Mr. R. C. Notcutt, Woodbridge. The flowers of this variety measure 2 inches across, and are violet-mauve in colour, tinted with pale corn-flower blue. The centre has a few traces of white. The spike exhibited was tall and tapering, and the flowers were not crowded upon it.

To *Iris gracilipes* (votes, 17 for), from the Wargrave Plant Farm, Liverpool Street, E.C. A free-flowering dwarf species from Japan, bearing small pale lilac flowers. The leaves are narrow and grass-like. The plant is about 8 inches high.

To *Paeonia* 'L'Espérance' (votes, unanimous), from Messrs. Kelway, Langport. A remarkable hybrid between *P. lutea* and *P. Moutan*. The flowers are pale lemon-yellow in colour, and have two rows of petals, each of which has a dull crimson blotch at the

base. The anthers are golden, and the blooms measure 6 inches across. The foliage is like that of *P. Moutan*.

To *Papaver orientale* 'Perry's Unique' (votes, 15 for, 2 against), from Mr. A. Perry, Enfield. A good border variety, growing 18 inches high, and bearing bright scarlet single flowers measuring 6 inches across. Each petal has a dark blotch, and the margin is deeply fringed.

To *Potentilla* 'Boule de Feu' (votes, 11 for, 1 against), from Mr. H. Hemsley, Crawley. This useful rock plant is the result of a cross between *P. argrophylla* and *P. atrosanguinea*. It has deep scarlet flowers and silvery foliage. It is free-flowering, and grows from 6 to 8 inches high.

To *Primula* × 'Excelsior' (votes, unanimous), from Messrs. J. Veitch, Chelsea. A charming *Primula* resulting from a cross between *P.* × *Unique* ♂ and *P. Cockburniana* ♀. In the size of the flowers and in the foliage it resembles the former, but it is of a rich cherry-red (shade 3, "Répertoire de Couleurs"). The stems and calyces are covered with farina. The plant is hardy, perennial, and about 1 foot high.

To *Salix magnifica* (votes, 13 for), from Hon. Vicary Gibbs (gr. Mr. E. Beckett, V.M.H.), Elstree. A remarkable Chinese shrub, quite unlike the already known species of *Salix*. The leaves are ovate, measuring 6 inches long by 3½ inches broad, dark green above and light green below, glabrous, minutely serrated, and joined to the main stem by dull red petioles. The shrub appears to be a quick grower, and is a very decorative foliage plant. (Fig. 148.)

To *Stachys corsica* (votes, 10 for, 4 against), from Messrs. Wallace, Colchester. A pretty prostrate species, suitable for the rock-garden. It is covered with small creamy-white flowers, which are tinged with pink. The leaves are small and ovate.

Cultural Commendation.

To Sir Everard Hambro, K.C.V.O. (gr. Mr. Grandfield), Hayes Place, Hayes, for a very fine 15-year-old specimen of *Saxifraga longifolia* growing in a pan.

Other Exhibits.

Messrs. Artindale, Sheffield : hardy plants.

Messrs. Baker, Codsall : hardy plants.

Messrs. Barber, Newcastle : Chrysanthemum 'Queen of the Earlies.'

Mr. W. Baxter, Plumstead : Geranium 'Cotswold.'

Messrs. Bide, Farnham : Sweet Peas.

Messrs. Brown, Peterborough : hardy plants.

Messrs. Cannell, Eynsford : Roses.

Mr. C. W. Chantler, St. Mary Cray : Irises, &c.

Messrs. Cheal, Crawley : flowering shrubs.

Mr. C. Elliott, Stevenage : alpines.

Messrs. Fells, Letchworth : hardy plants.

Mr. E. J. Hicks, Twyford : Roses.
 Misses Hopkins, Shepperton : hardy plants.
 Mr. W. Lawrenson, Yarm : Poppy 'Lady in White.'
 Messrs. Carter Page, London Wall : Pelargoniums, Violas, &c.
 Messrs. G. Paul, Cheshunt : Rose species.
 Messrs. Peed, West Norwood : Gloxinias.
 Messrs. Perkins, Northampton : Rose 'Nancy Perkins.'
 Messrs. Reamsbottom, Geashill : Anemones.
 Messrs. Rochford, Broxbourne : Araucaria 'Silver Star.'
 Mr. A. L. Smith, Catford : Cape Pelargoniums.
 Messrs. Sutton, Reading : Aquilegias.
 H. J. Talbot, Esq., Berkhamstead : Stock 'Beauty of Nice.'
 Messrs. Thomson and Charman, Bushey : alpines.
 Messrs. Whitelegg and Page, Chislehurst : hardy plants.

FLORAL COMMITTEE, JUNE 5, 1913.

SUB-COMMITTEE AT WISLEY.

Mr. H. B. MAY, V.M.H., in the Chair, and eight members present.

Awards Recommended :—

Award of Merit.

To the following Violas, which were planted in October 1912 :
 'Admiral of the Blues,' 'Agnes Kay,' 'Alexandra,' 'Bethea,' 'Blue
 Duchess,' 'Bridal Morn,' 'Fred Williams,' 'Purity,' 'Redbraes
 Bronze,' 'Redbraes White,' 'Redbraes Yellow,' 'Royal Scot,'
 'Sulphurea,' and 'Virgin White.'

(For descriptions, see Report of Wisley trial, p. 381.)

FLORAL COMMITTEE, JUNE 17, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-three members
 present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. B. R. Cant, Colchester, for Roses.

Silver-gilt Banksian Medal.

To Messrs. May, Upper Edmonton, for Ferns.

To Mr. L. R. Russell, Richmond, for trees and shrubs.

Silver Flora Medal.

To Messrs. Bath, Wisbech, for Pæonies &c.

To Mr. J. Box, Haywards Heath, for hardy plants.

To Messrs. Carter, Raynes Park, for Irises.

To Messrs. Cutbush, Highgate, for hardy plants.

To Messrs. Kelway, Langport, for Pæonies and Delphiniums.

To Messrs. J. Veitch, Chelsea, for Pæonies, Cannas, &c.

To Messrs. Wallace, Colchester, for hardy plants.

Silver Banksian Medal.

- To Messrs. Barr, Covent Garden, for hardy plants.
- To Mr. H. Burnett, Guernsey, for Carnations.
- To Mr. J. Douglas, Great Bookham, for Carnations.
- To Messrs. Jackman, Woking, for hardy plants.
- To Messrs. Jones, Lewisham, for Campanulas &c.
- To Messrs. S. Low, Bush Hill Park, for Carnations.
- To Messrs. G. Paul, Cheshunt, for Pæonies.
- To Mr. A. Perry, Enfield, for hardy plants.
- To Mr. M. Prichard, Christchurch, for hardy plants.
- To Mr. G. Reuthe, Keston, for hardy plants.
- To Messrs. Ware, Feltham, for hardy plants.
- To Messrs. Whitelegg and Page, Chislehurst, for hardy plants.

Bronze Flora Medal.

- To Messrs. Brown, Peterborough, for hardy plants.
- To Messrs. Bunyard, Maidstone, for hardy plants.
- To Messrs. Cheal, Crawley, for trees and shrubs.
- To Messrs. F. Smith, Woodbridge, for hardy plants.

Bronze Banksian Medal.

- To Mr. C. Blick, Hayes, for Carnations.
- To Messrs. Fells, Letchworth, for Primulas.
- To Guildford Hardy Plant Nursery, Guildford, for hardy plants.
- To Mr. F. Lilley, Guernsey, for Sparaxis, Gladioli, &c.
- To Mr. R. C. Notcutt, Woodbridge, for hardy plants.
- To Messrs. Carter Page, London Wall, for Dahlias, &c.
- To Messrs. Peed, Mitcham, for hardy plants.
- To Messrs. Phillips and Taylor, Bracknell, for hardy plants.
- To Messrs. Piper, Bayswater, for Delphiniums.

Award of Merit.

To *Astilbe* 'Britannia' (votes, unanimous), from Mr. W. Proffittlich, Twickenham. A charming plant, growing 3 feet high and bearing plumes of pale rosy-lilac flowers in profusion. It appears to be a vigorous grower, and is the result of a cross between *Astilbe* 'Queen Alexandra' and *A. chinensis*.

To *Blandfordia Cunninghamii* (votes, 10 for, 1 against), from A. Worsley, Esq., Isleworth. An interesting plant belonging to the Liliaceae. It was discovered by the late Allan Cunningham, and is a native of the mountains of New South Wales. The leaves are 1-2 feet long, radical, erect and spreading, bright green above and pale below, narrow and linear. The pendulous flowers are borne on short pedicels, in a terminal umbellate panicle, on a stout scape about 2 feet high. The perianth is conical and about 2 inches long. It is bright orange-scarlet in colour, with golden-yellow segments. The interior of the flower is all yellow.

To Carnation 'Scarlet Gem' (votes, 9 for, 3 against), from

Mr. C. Blick, Hayes. A good scarlet 'Border' variety, with smooth-edged petals and excellent form.

To Carnation 'Thomas à Becket' (votes, 10 for), from Mr. C. Blick, Hayes. A large 'Border' variety, of fine form. The ground colour is pale yellow, suffused with bright rose.

To Gladiolus 'Queen of the Whites,' from Mr. B. Hoogstraten, Sassenheim, Holland. This is an excellent variety, bearing large pure white flowers in a magnificent spike. This award was recommended by a joint committee of the R.H.S. and the Gladiolus Society.

To Pæony 'Gismonda' (votes, 11 for, 3 against), from Messrs. R. H. Bath, Wisbech. A large and very full-flowered variety, of a pale rose-pink colour. It has a very pleasing fragrance, and is said to last well when cut. It is claimed that the plant is a good grower and very free-flowering in habit.

To *Philadelphus* 'Norma' (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. Bain), Dorking. A charming flowering shrub, bearing large, single, creamy-white flowers measuring 2 inches across. The petals are broadly ovate in shape, and the blooms are borne very freely all the way along the shoot.

To Rose 'Mrs. George Norwood' (votes, 14 for), from Mr. E. J. Hicks, Twyford. A new seedling Hybrid Tea, resulting from a cross between 'Frau Karl Druschki' and 'Madame Gabriel Luizet.' It is of splendid form and of a deep rose-pink colour. It has a delicious scent. The fine foliage and the growth resemble the former parent in character.

To Rose 'Paul's Lemon Pillar' (votes, 14 for), from Messrs. Paul, Cheshunt. A beautiful hybrid Noisette pillar rose. The flowers are of lovely shape, pale sulphur-yellow in colour, and have a very pleasing fragrance. The foliage is large and dark green.

To *Saxifraga Brunoniana* (votes, 12 for), from Messrs. Fells, Letchworth. A charming rock plant from the Himalayas. The chief beauty of the plant lies in the numerous long, hair-like, red stolons which almost cover the plant. In sunlight these stolons are particularly attractive. The leaves are small, lanceolate, and arranged in rosettes. The margins are spiny. The flowers are small, deep lemon-yellow in colour, and are borne 3 or 4 inches above the foliage.

To *Spiraea Sargentiana* (votes, 10 for, 4 against), from Hon. Vicary Gibbs (gr. Mr. E. Beckett, V.M.H.), Elstree. A new shrub, raised from seed sent from China by Mr. E. H. Wilson, V.M.H. The plant exhibited was about 3 feet high and of free-branching habit. The flowers were small and sulphury-white in colour. They are borne very freely in small flat corymbs. The leaves are small, dark green in colour, and ovate in shape.

To *Statice Suworowi alba* (votes, unanimous), from Mr. R. C. Notcutt, Woodbridge. The flowers of this very decorative annual plant are white, and are produced in dense, branched spikes. The leaves are radical and oblong-lanceolate in shape.

To Sweet Pea 'Dobbie's Frilled Pink' (votes, unanimous), from



FIG. 147.—*OLEARIA CHATHAMICA*. (*Gard. Chron.*) (p. cxxxiv.)

[To face p. cxi.]



FIG. 148.—*SALIX MAGNIFICA*. (p. cxxxvii.)

Messrs. Dobbie, Edinburgh. A large flower with crinkled standard and wings. The colour is a delicate and very pretty shade of pale lilac-rose.

To Sweet Pea 'Edith Taylor' (votes, 10 for, 2 against), from Mr. T. Stevenson, Addlestone. A charming deep carmine variety, of large size. The standard is very broad and crinkled. The flowers are borne mostly in fours, and the colour looks particularly well in strong sunlight.

To *Trollius patulus*, Bees' var. (votes, 14 for), from Messrs. Bees, Ltd., Liverpool. A new form, collected in open mountain pastureland on the Kari Pass, Yangtse-Hokong divide, S.E. Tibet, in September 1904, by Mr. G. Forrest. It was found at an altitude of 12,000 feet in latitude 28° N. It grows about 1 foot high, and carries deep yellow single flowers in great profusion. Each bloom measures 2½ inches across and has a bunch of golden anthers. The leaves are three-lobed, serrate, and dark green in colour.

Other Exhibits.

Messrs. Clark, Dover : hardy plants.

Mr. A. Collins, Ashford : Pelargonium.

Messrs. Fairbairn, Carlisle : Delphiniums.

Mr. E. Friar, Sittingbourne : Clematis.

Messrs. Grove, Sutton Coldfield : Dianthus.

Mr. J. Hilling, Enfield : Lobelia 'Mrs. J. Hilling.'

Messrs. Hobbies, Dereham : Roses.

Mary, Countess of Ilchester, Abbotsbury : *Pittosporum grandiflorum* and *Prostanthera lasianthos*, F.C.C. 1888.

Mr. H. Newman, Watford : Pink 'Challenger.'

Mr. J. J. Newman, Tooting : Pelargonium 'Galilee.'

Messrs. Reamsbottom, Geashill : Anemones.

Mr. P. van Deursen, Sassenheim : Pæonies and Gladioli.

Wargrave Plant Farm, Ltd., Liverpool Street : hardy plants.

A. Wood, Esq., Sutton Coldfield : *Meconopsis cambrica* 'Tangerine.'

FLORAL COMMITTEE, JULY 1, 1913.

AT HOLLAND HOUSE.

Mr. H. B. MAY, V.M.H., in the Chair, and nineteen members present.

[For Cups and Medals awarded by the Council after consultation with the Judges, see p. cii.]

Awards Recommended :

First-class Certificate.

To *Adiantum trapeziforme* 'Queen Mary' (votes, unanimous), from Messrs. H. B. May, Upper Edmonton. A beautiful plumose sport from the type. The large pinnules are deep pea-green in colour and have their margins prettily fringed. The stems are black and wiry, and reach over two feet in length. The young fronds are especially beautiful, being of a lovely pale green colour.

To *Magnolia Delavayi* (votes, unanimous), from Messrs. J. Veitch, Chelsea. A very handsome new species from Southern China. The plant exhibited was growing in a tub and had reached about 4 feet in height. It carried two large flowers about 6 inches in diameter, with broad, rich cream-coloured petals. The leaves are most attractive. They are evergreen, oval in shape, and measure about 10 inches long by 6 inches broad. The margin is entire, but waved, and the upper surface is dark green and slightly glossy.

Award of Merit.

To *Adiantum Siebertianum* (votes, unanimous), from Messrs. H. B. May, Upper Edmonton. A very elegant new species, having overlapping wedge-shaped pinnules somewhat resembling those of *A. Wiegandii*. It is more slender and graceful in form and is lighter in colour than that form. The young fronds have a delicate reddish tint shading through them which renders them very charming.

To Carnation 'The Baron' (votes, 15 for, 1 against), from Mr. J. Douglas, Great Bookham. A large 'Border' variety, having a clear yellow ground flaked with lilac and rose. The petals are prettily crinkled.

To Carnation 'Virginia' (votes, 10 for), from Mr. J. Douglas, Great Bookham. Another fine 'Border' variety, having a buff ground, suffused and edged with bright rose. The flowers are large and have good non-splitting calyces and smooth-edged petals.

To *Erigeron hybrida* 'Pink Pearl' (votes, 8 for, 4 against), from Mr. A. Perry, Enfield. A very free-flowering hardy plant, growing about 1½ foot high and bearing flowers which measure 1 inch across and have the ray florets rosy-pink and the disc greenish yellow. It is bushy in habit, and the flowers are said to last well in water when cut.

To *Iris Kaempferi* 'Morning Mists' (votes, 10 for, 2 against), from Messrs. Wallace, Colchester. This is probably one of the largest, and most beautiful forms of the Japanese Iris yet introduced. The flowers measure 9 inches across, and have pure white falls 4 inches broad, suffused in the upper half with pale blue, which gradually fades as the flowers develop. The claw of the falls is blotched with greenish-yellow. The standards are white. The foliage is broad and arching, and the plants are of average height.

To *Nepenthes* × *atropurpurea* (votes, unanimous), from Messrs. J. Veitch, Chelsea. A very handsome plant, obtained as the result of a cross between *N. sanguinea* and *N. Curtisii superba*. The pitchers are about 9 inches long, dull crimson, with a pale green interior, blotched with crimson. The rim is broad, ribbed, and of a dark red-crimson colour. The ribs are narrow and ciliated. The plant carried three pitchers.

To *Nepenthes* 'Lewis Bradbury' (votes, unanimous), from Messrs. J. Veitch, Chelsea. This beautiful variety was raised from *N. sanguinea* and *N. mixta*. The magnificent pitchers are large and of

a dull red colour, blotched with deeper shades. The wings are broad and conspicuously fringed, while the interior is much blotched with dull crimson. The rim is broad, ribbed and crimson. This plant had two pitchers.

To *Polypodium Mayi cristatum* (votes, unanimous), from Messrs. H. B. May, Upper Edmonton. A beautiful glaucous fern, having long arching fronds. It is a plumose and crested form of the type.

To Rose 'Mrs. Godfrey Brown' (votes, 8 for, 3 against), from Messrs. Hugh Dickson, Belfast. A very charming pale rosy-pink Hybrid Tea variety, with large flowers of nice shape. It has large, healthy foliage.

To Rose 'Muriel Dickson' (votes, 11 for, 1 against), from Messrs. Hugh Dickson, Belfast. A pretty hybrid Austrian Briar with large semi-double flowers, with broad petals of a rich carmine colour. The large thorns borne by this variety were very noticeable.

To Rose 'Ophelia' (votes, unanimous), from Messrs. W. Paul, Waltham Cross. A charming Hybrid Tea variety, of beautiful shape. The buds are long and pointed, while the petals, which recurve at the margins, are pink, with a slight shading of pale apricot at the base. This is a very fragrant variety.

To Rose 'Ulster Standard' (votes, 11 for, 1 against), from Messrs. Hugh Dickson, Belfast. A deep velvety crimson single Hybrid Tea variety, with very broad petals. The sprays exhibited were covered with buds, indicating a very free-flowering habit.

Other Exhibits.

J. S. Arkwright, Esq., Presteign : *Lychnis* × *Arkwrightii*.

W. Astor, Esq., M.P., Cliveden : Delphinium 'Cliveden Beauty.'

Messrs. Barber, Newcastle-on-Tyne : *Chrysanthemum maximum* 'Queen of the Earlies.'

Messrs. Barr, Taplow : Lobelia 'Cambridge Blue.'

H. Barton, Esq., Antrim : Mimulus 'Cherry Ripe.'

Messrs. Bees, Liverpool : hardy plants.

Burton Hardy Plant Nurseries, Christchurch : *Sedum farinosum*.

Messrs. F. Cant, Colchester : Roses.

Mrs. Denison, Little Gaddesden : Rose 'Countess de Nadalac.'

Mr. W. Easlea, Leigh-on-Sea : Rose 'Cherry Page.'

Mr. Gentle, Little Gaddesden : Sweet Peas.

Messrs. Godfrey, Exmouth : Pelargoniums and *Scabiosa caucasica superba*.

W. W. Gott, Esq., Par Station, Cornwall : Malmaison Carnation 'Improved Duchess of Westminster.'

Messrs. Harkness, Bedale : Poppies and Gaillardias.

Mr. T. R. Hayes, Keswick : *Erica cinerea atrococcinea*.

Mr. H. Hemsley, Crawley : *Inula acaulis* and strain of Alpine Antirrhinums.

Messrs. Jackman, Woking : Clematis 'Mrs. Spencer Castle' and *Tunica Saxifraga alba*.

Messrs. Jones, Lewisham : Pelargonium ' Henry West.'
 Messrs. Kelway, Langport : Delphiniums &c.
 G. J. Morris, Esq., Hendon : Begonia ' Lady Emily.'
 Mr. C. Smith, Guernsey : Gladiolus ' Cleopatra.'
 Messrs. Sutton, Reading : new Red Sunflower.
 Wargrave Plant Farm, Liverpool St., E.C. : Delphiniums.
 Miss Wilmott, V.M.H., Great Warley : *Hydrangea plataniifolia*.

FLORAL COMMITTEE, JULY 15, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-three members present.

Awards Recommended :

Silver-gilt Banksian Medal.

To Mr. J. Box, Haywards Heath, for hardy plants.

Silver Flora Medal.

To Mr. J. Douglas, Great Bookham, for Border Carnations.

To Messrs. May, Upper Edmonton, for Ferns and Fuchsias.

To Messrs. Smith, Woodbridge, for hardy herbaceous plants.

Silver Banksian Medal.

To Messrs. Bunyard, Maidstone, for hardy plants.

To Messrs. Dobbie, Edinburgh, for Sweet Peas.

To Messrs. S. Low, Bush Hill Park, for Roses.

Bronze Floral Medal.

To Messrs. Clark, Dover, for hardy plants.

To Messrs. Carter Page, London Wall, for Violas and Pelargoniums.

To Mr. M. Prichard, Christchurch, for hardy plants.

To Messrs. Ware, Feltham, for hardy plants.

Bronze Banksian Medal.

To Mr. G. W. Miller, Wisbech, for hardy plants.

Award of Merit.

To Carnation ' Bookham White ' (votes, 18 for), from Mr. J. Douglas, Great Bookham. An excellent white ' Border ' variety. The flowers are very full, and the petals broad. The calyx is non-splitting.

To Carnation ' Firefly ' (votes, unanimous), from Mr. James Douglas, Great Bookham. A scarlet ' Border ' variety, of large size and good substance. It is of splendid form, and its calyx does not burst.

To Delphinium ' Mrs. W. J. Sanderson ' (votes, unanimous), from W. J. Sanderson, Esq. (gr. Mr. F. J. Sage), Eastfield Hall, Warkworth. A very pretty dark blue variety. The colour approaches marine blue, with a tint of violet-purple at the edges of the petals. The flowers are single, with a white eye, and are borne very evenly on good bold spikes.

Cultural Commendation.

To Colonel the Right Hon. M. Lockwood, C.V.O., M.P. (gr. Mr. A. Bagg), Bishop's Hall, Romford, Essex, for three plants of *Thladiantha dubia* in fruit.

Other Exhibits.

Messrs. Bolton, Buntingford : Roses.

Messrs. Cannell, Eynsford : Roses and Pelargoniums.

Mr. H. Chipperfield, Foulsham : Pelargoniums.

Mr. H. Crane, Highgate : Violettas.

Messrs. Cutbush, Highgate : greenhouse plants.

Messrs. Fells, Letchworth : rock plants.

Mr. W. H. Gardiner, St. Osyth : *Eschscholzia Mandarin caniculata*.

Mr. J. G. Gerrish, Tring : *Chrysanthemum maximum* 'Mrs. Williams.'

Guildford Hardy Plant Nursery, Guildford : hardy plants.

Messrs. Hobbies, Dereham : Roses.

Mrs. H. Horne, Northampton : Rose 'Mrs. Henry Horne.'

Messrs. Jacobs, Bognor : Carnations.

Miss Kingsford, Fulham : Carnation 'Katharine Wakeford.'

Mr. G. Reuthe, Keston : hardy plants.

Mr. L. R. Russell, Richmond : miscellaneous plants.

G. Shaw, Esq., Burgess Hill : Carnation 'Lady Florence.'

W. Van de Weyer, Esq., Corfe Castle : *Thunbergia Gibsonii*, A.M.
May 14, 1913 and *Delphinium Van de Weyeri*.

Messrs. J. Veitch, Chelsea : *Meconopsis rudis*.

Mr. H. J. Wheeler, Ilford : Carnations.

FLORAL COMMITTEE, JULY 29, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-five members present.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To Mr. A. Perry, Enfield, for Astilbes, Nymphaeas, &c.

Silver Flora Medal.

To Messrs. Jones, Lewisham, for Phloxes.

To Messrs. May, Upper Edmonton, for Ferns.

To Mr. M. Prichard, Christchurch, for hardy plants.

To Mr. L. R. Russell, Richmond, for stove plants and Hydrangeas.

To Messrs. J. Veitch, Chelsea, for Gloxinias and *Thalictrum dipterocarpum*.

Silver Banksian Medal.

To Mr. J. Box, Haywards Heath, for Phloxes and Sweet Peas.

To Messrs. Cutbush, Highgate, for foliage plants and cut flowers.

To Mr. J. Douglas, Great Bookham, for Border Carnations.
 To Mr. G. W. Miller, Wisbech, for hardy plants.
 To Messrs. Phillips and Taylor, Bracknell, for bog and water plants.
 To Messrs. Wells, Merstham, for Phloxes.
 To Messrs. Ware, Feltham, for hardy plants.

Bronze Flora Medal.

To Messrs. Baker, Codsall, for Astilbes.
 To Mr. G. Reuthe, Keston, for hardy plants.
 To Messrs. Sutton, Reading, for Sunflowers.
 To Mr. A. Turner, Slough, for Spiræas.

Bronze Banksian Medal.

To Messrs. Carter Page, London Wall, for Violas and Antirrhinums.
 To Messrs. W. Paul, Waltham Cross, for Roses.

First-class Certificate.

To *Gladiolus* 'Electra' (votes, 5 for, 2 against), from Messrs. P. Hopman, Hillegom, Holland. The flowers of this variety are very fine, measuring 4 inches across. The colour is reddish-salmon, while the lower petal has an irregular blotch of cream upon it, and is bright blood-red at the base. The spike is of medium length.

Award of Merit.

To Carnation 'Rosy Morn' (votes, unanimous), from Mr. J. Douglas, Great Bookham. An excellent Border variety, of large size, with smooth-edged petals and a good calyx. The colour is deep rose. The flowers have a faint perfume and are supported on strong stems.

To *Clematis tangutica obtusiuscula* (votes, 14 for, 1 against), from F. C. Stern, Esq., Goring-by-Sea. An interesting climber, collected by Mr. G. Fenwick-Owen in the Chone district, West Kansu, China, in 1911. The seed was sown by the exhibitor in 1912, and the resultant plants flowered out of doors for the first time in 1913. The flowers are single, solitary, about 2 inches across, and golden yellow in colour. The stems of the plant are purplish. The foliage is glabrous, finely divided, with five to seven leaflets, each ternately divided.

To *Dendromecon rigidum* (votes, unanimous), from Sir Trevor Lawrence, Bart. (gr. Mr. Bain), Burford Lodge, Dorking. A remarkable Californian shrub of erect habit, bearing numerous solitary, terminal flowers, measuring 2½ inches across. The four subrotundate crenulate petals are bright buttercup-yellow in colour, while the centre is occupied by numerous orange stamens. The leaves are from 2 to 4 inches long, on short petioles, lanceolate, glabrous, acuminate, rigid, and glaucous green. The plant has proved hardy at Dorking, and is there given a position and treatment similar to that afforded to *Romneya Coulteri*.

To *Gladiolus* 'Frank Paddleton, Jr.' (votes, 5 for, 1 against), from Firma P. Vos Mz., Sassenheim, Holland. A very large, pretty variety, with deep rose flowers, heavily blotched with reddish-crimson. The spike is of medium size.

To *Gladiolus* 'Incontestable' (votes, unanimous), from Messrs. Alkemade, Noordwijk, Holland. A magnificent variety, white in colour, with a blood-red blotch at the base of the petals. Spike good.

To *Gladiolus* 'King of the Blues' (votes, 6 for, 3 against), from Mr. K. Velthuys, Hillegom, Holland. A very striking variety, bearing very dark violet flowers on a medium spike.

To *Gladiolus* 'Liebesfeuer' (votes, unanimous), from Mr. de Ruyter, Noordwijk. A grand scarlet variety, borne on a long spike.

To *Gladiolus* 'Loveliness' (votes, unanimous), from Mr. de Ruyter, Noordwijk. A very large pale sulphury-white variety. The middle lower petal is deeper, and is streaked with light crimson. The flowers are borne in a good bold spike.

To *Gladiolus* 'Pink Perfection' (votes, unanimous), from Messrs. P. Hopman, Hillegom. A lovely apple-blossom pink variety, having the margins of the petals flaked with salmon, and the bases crimson. The spikes are of moderate length.

To *Gladiolus* 'Prince of Wales' (votes, unanimous), from Mr. van Zanten, Hillegom. A charming orange-salmon variety, having the lower petals blotched with pale yellow, and tinged with crimson at the base. Spikes good.

To *Gloxinia* 'Veitch's Strain' (votes, unanimous), from Messrs. J. Veitch, Chelsea. A magnificent strain, producing very large flowers in great profusion. The colours are very fine, including white, various shades of pink, crimson, violet, violet-purple and deep purple. In some cases the throats are white and in others spotted. The plants exhibited were raised from seed sown in January, and thus they were only six months old.

To *Nymphaea colossea* (votes, unanimous), from Leopold de Rothschild, Esq., C.V.O. (gr. Mr. J. Hudson, V.M.H.), Gunnersbury House, Acton. As its name denotes, this is a very large-flowered variety, and its remarkable vigour renders it especially suitable for large expanses of water, where it can be allowed plenty of room to develop. The flowers measure 9 inches or more across, and the petals are sulphury-white, delicately shaded at the base with rose-pink. The flowering season extends from early spring until the end of October.

To *Nymphaea* 'Escarboucle' (votes, unanimous), from Leopold de Rothschild, Esq., C.V.O. (gr. Mr. J. Hudson, V.M.H.), Gunnersbury House, Acton. A very beautiful variety, measuring about 6 inches across, remarkable for its intense vermilion colour, which is uniform throughout the petals and quite a unique shade in Water-Lilies. The plant is a good grower and flowers freely.

To Rose 'Annie Crawford' (votes, unanimous), from Mr. W. R. Hammond, Grovelands, Burgess Hill, Sussex. A new seedling H. P. from 'Captain Hayward' and 'Mrs. Sandford,' raised by Dr. Campbell Hall. The flowers are large, of perfect form, deep rose-pink, very slightly scented.

To *Spiraea arborea grandis* (votes, unanimous), from Hon. Vicary Gibbs (gr. Mr. E. Beckett, V.M.H.), Elstree. This handsome plant

was exhibited under the name of *Sorbaria*, and was raised from seed sent from China by Mr. E. H. Wilson, V.M.H. The flowers are creamy-white, and are disposed in large graceful panicles. The leaves are large, pinnate; leaflets opposite, lanceolate, dark green.

To Sweet Pea 'Dobbie's True Lavender' (votes, 9 for, 2 against), from Messrs. Dobbie, Edinburgh. A very fine pale lavender-blue variety, with large flowers, borne mostly in threes on stout stalks. The standards are prettily crinkled.

To Sweet Pea 'King White' (votes, 13 for), from Messrs. Dobbie, Edinburgh. A large milk-white variety, borne mostly in fours. The standard is very broad and crinkled.

To Sunflower 'Sutton's New Red' (votes, 11 for, 5 against), from Messrs. Sutton, Reading. This interesting annual was obtained as the result of a cross between *Helianthus lenticularis coronatus* and *Helianthus annuus*, made by Professor Cockerell, of Bolder University, Colorado, U.S.A. The conspicuous disc is surrounded by a broad band of chestnut-red, which is circled by deep golden yellow. The diameter of the bloom is about 6 inches. (Fig. 149.)

NOTE.—All the above awards to Gladioli were recommended by a joint Committee of the R.H.S. and the Gladiolus Society.

Other Exhibits.

Messrs. Cheal, Crawley: Roses and miscellaneous plants.

Messrs. Fells, Letchworth: rockery.

Guildford Hardy Plant Nursery, Guildford: hardy plants.

Mr. W. F. Hamilton, Lymington: *Sorbaria arborea*.

Mr. C. A. Jardine, Holt: Violas.

Messrs. Kelway, Langport: *Chrysanthemum leucanthemum* 'Antarctic.'

Messrs. Michie, Alnwick: Pink 'Mrs. Beckett Clayhills.'

Mr. H. W. Monington, Horley: *Viola cornuta* 'Mary Glynne.'

D. S. Pring, Esq., Newport: Geranium 'Lady Godfrey Baring.'

G. Shaw, Esq., Burgess Hill: Carnations.

Mr. A. L. Smith, Catford: Carnation 'Caviare.'

FLORAL COMMITTEE, AUGUST 12, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and twenty-two members present.

Awards Recommended:—

Silver-gilt Flora Medal.

To Messrs. Kelway, Langport, for Gladioli.

Silver-gilt Banksian Medal.

To Mr. M. Prichard, Christchurch, for hardy plants.

Silver Flora Medal.

To Messrs. Vert, Saffron Walden, for Hollyhocks.



FIG. 149.—NEW RED SUNFLOWER. (*Sutton.*) (p. cxlviii.)

[To face p. cxlviii.]



FIG. 150.—ODONTOGLOSSUM × 'OTHMARSCHEN.' (p. clv.)

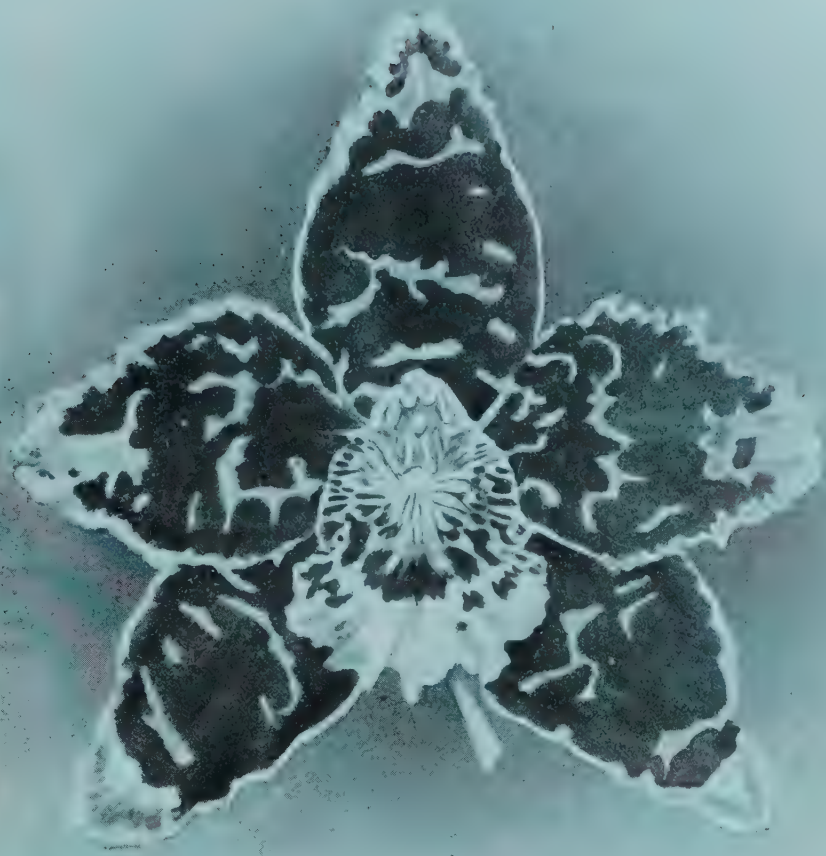


FIG. 151.—ODONTOGLOSSUM × 'QUEEN OF GATTON.' (p. clv.)



FIG. 152.—ODONTIODA × 'CHANTICLEER.' (p. clv.)

[To face p. cxlix.

Silver Banksian Medal.

To Messrs. Cutbush, Highgate, for *Gladiolus* and miscellaneous plants.

To Messrs. Dobbie, Edinburgh, for Dahlias and Scabious.

To Messrs. May, Upper-Edmonton, for Ferns.

To Messrs. Ware, Feltham, for hardy plants.

To Messrs. Wells, Merstham, for Phloxes &c.

Bronze Flora Medal.

To Mr. A. Perry, Enfield, for Delphiniums &c.

To Mr. G. Reuthe, Keston, for hardy plants.

Bronze Banksian Medal.

To Messrs. Cole, London, for *Pelargoniums* &c.

Award of Merit.

To *Agapanthus inapertus* (votes, unanimous), from A. Worslev, Esq., Isleworth. A charming and very distinct variety, having drooping tubular flowers measuring 2 inches long, borne in large umbels. The colour approaches Dauphin's blue. The pedicels measure $1\frac{1}{2}$ inch in length, and are green, tinted with blue. (See p. 363.)

To *Caladium 'Madame René Marot'* (votes, 10 for, 1 against), from R. Hoffmann, Esq. (gr. Mr. T. Tomlinson), Streatham, S.W. A very handsome variety, with medium-sized leaves, having an old-rose ground, mottled with varying shades of pink; veins bright carmine; edges spotted with green.

To *Dahlia 'Dungeness'* (votes, 13 for, 1 against), from Messrs. Dobbie, Edinburgh. A good variety of the 'Collarette' type, having broad, bright scarlet florets, and a collar of deep yellow. The diameter of the flowers is 5 inches.

To *Gladiolus 'Craigianour'* (votes, unanimous), from Messrs. Kelway, Langport. Flowers large, of fine form, rich salmon-carmine, tinged with crimson in the lower petals, which also have a white streak in the middle. Spike good and well furnished with blooms.

To *Lysionotus warleyensis* (votes, 10 for, 1 against), from Miss Willmott, F.L.S., V.M.H. (gr. Mr. Fielder, V.M.H.), Great Warley. A charming dwarf shrub belonging to the Gesneraceae, introduced from China by Mr. E. H. Wilson, V.M.H. The flowers resemble those of a *Pentstemon* in shape, and measure $1\frac{3}{4}$ inch long. They are white in colour, streaked with dull crimson inside the tube, along which run two pale yellow ridges. The leaves are oblong-lanceolate, serrate, having the margins tinted with crimson. The plant exhibited was not more than 9 inches in height. Its hardiness in this country has not yet been tested.

Other Exhibits.

Messrs. Artindale, Sheffield: *Bidens dahlioides*.

Messrs. Baker, Codsall: Phlox.

A. W. Chaplin, Esq., Great Amwell: *Saxifraga florulenta*, F.C.C.

Lady Catherine Milnes Gaskell, Much Wenlock : *Dianthus* 'Wenlock Delight.'

Messrs. Hurst, Houndsditch : Marigold 'Meteor' and a pure white *Nigella* 'Miss Jekyll.'

Messrs. Jones, Lewisham : Phlox 'Mrs. H. J. Jones.'

Sir Trevor Lawrence, Bart., Dorking : Antirrhinum 'Purple King' and *Platycodon grandiflorum semi-duplex*, F.C.C. 1900.

Mr. W. Murdy, Warkworth : Pelargonium 'Mrs. Deuchar.'

F. W. Platt, Esq., Highgate : Viola 'Ken View Seedling' and Carnation 'Mrs. F. W. Platt.'

Mr. J. Rochester, Hurstgreen : Carnations.

Mr. L. R. Russell, Richmond : flowering shrubs &c.

Rev. H. A. Soames, Bromley : Carnation 'Lyncroft.'

Messrs. Stark, Great Ryburgh : Sweet Peas.

N. Turner, Esq., Welshpool : Calceolarias.

Lady Harriet Warde, Tonbridge : Carnations.

Mr. W. Wilkinson, Bishop Stortford : Phloxes.

FLORAL COMMITTEE, AUGUST 26, 1913.

Mr. H. B. MAY, V.M.H., in the Chair, and eighteen members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Mr. J. Box, Haywards Heath, for Phloxes &c.

To Messrs. Kelway, Langport, for Gladioli.

Silver-gilt Banksian Medal.

To Messrs. Blackmore & Langdon, Bath, for Begonias.

To Messrs. Ware, Feltham, for Begonias and hardy plants.

Silver Flora Medal.

To Messrs. Dobbie, Edinburgh, for Dahlias.

To Mr. A. F. Dutton, Iver, for Carnations.

To Messrs. Wallace, Colchester, for Montbretias.

Silver Banksian Medal.

To Messrs. Carter Page, London Wall, for Dahlias.

To Messrs. Cutbush, Highgate, for Gladioli, Pentstemons, &c.

To Mr. A. Ll. Gwillim, Sidcup, for Begonias and hardy plants.

To Messrs. May, Upper Edmonton, for ferns and miscellaneous plants.

To Messrs. Wells, Merstham, for Phloxes.

To Messrs. Whitelegg & Page, Chislehurst, for hardy plants.

Bronze Flora Medal.

To Messrs. Barr, Covent Garden, for hardy plants.

To Monsieur Jules Ragot, Paris, for Gladioli.

Bronze Banksian Medal.

To Messrs. Cheal, Crawley, for Dahlias.

To Messrs. Piper, Bayswater, for Dahlias.

To Mr. L. R. Russell, Richmond, for hardy Heaths.

Award of Merit.

To Chrysanthemum 'Improved Northern Star' (votes, unanimous), from Messrs. Dobbie, Edinburgh. A very useful hardy annual. The flowers are large and measure $3\frac{1}{2}$ inches across. The ray florets are white, and the dark disc is surrounded by a narrow ring of yellow. The flowers are borne in great profusion on very strong stems.

To Dahlia 'Aphrodite' (votes, unanimous), from Mr. C. Turner, Slough. A Pæony-flowered variety, having very wide, sulphury-white ray florets, surrounding a small golden-yellow disc. The flowers are 6 inches in diameter, and are borne on very strong, erect stems. A very useful variety for garden decoration or for cutting.

To Dahlia 'Lily Reed' (votes, 6 for), from Mr. H. Shoesmith, Woking. A beautiful Cactus variety of nice form, with slightly twisted florets. The colour is very deep yellow.

To Dahlia 'Prince of Orange' (votes, 6 for), from Messrs. Dobbie, Edinburgh. This is one of the best of the Collarette type yet introduced. The colour is reddish-orange, and the collar is of the same shade, but a little paler, while the reverse of the petals is buff. The flowers measure 5 inches across and are carried on strong stems.

To Dahlia 'Regulus' (votes, unanimous), from Messrs. Cheal, Crawley. A very neat, compact, and distinct Pompon variety. It is purplish-crimson in colour.

To Dahlia 'Tusca' (votes, 6 for, 1 against), from Messrs. Dobbie, Edinburgh. A useful Collarette variety, having the ray florets very bright crimson, tipped with white. The golden-yellow centre is surrounded by a band of yellow. The small florets forming the collar are sulphury-white. The flowers measure 5 inches across and are supported on stiff stems.

To Gladiolus 'Lady Faire' (votes, unanimous), from Messrs. Kelway, Langport. Flowers very wide, white; lower petals heavily blotched with crimson. Spike medium.

To Gladiolus 'Lady Northcote' (votes, unanimous), from Messrs. Kelway, Langport. Flowers large, amber-yellow, heavily suffused and flaked with salmon, especially at the margins. The middle lower petal is slightly streaked with crimson at the base.

To Gladiolus 'Mrs. Bromet' (votes, unanimous), from Messrs. Kelway, Langport. Flowers, pale amber-yellow, slightly tinged with salmon at the edges. The middle lower petal is a little deeper in colour, and is tinged with crimson at the base. Spike good.

To Montbretia 'Queen Adelaide' (votes, unanimous), from Sydney Morris, Esq. (gr. Mr. G. Henley), Earlham Hall, Norwich. A very beautiful variety, resulting from a cross between 'George Henley' and 'Prometheus.' The flowers are slightly over 3 inches in width

and are of a deep reddish-orange colour, which shades to pure orange at the base of the petals, where a brown blotch occurs. It is said to be a good grower, and flowered for the first time in 1911.

To Rose 'Mrs. Andrew Carnegie' (votes, 8 for, 1 against), from Messrs. Cocker, Aberdeen. A beautiful H. T. of great size and good substance, obtained as the result of a cross between 'Frau Karl Druschki' and 'Niphetos,' the latter being the pollen parent. The colour is white, faintly tinted with lemon. The flowers possess a very pleasing fragrance and have very deep petals.

To *Scabiosa caucasica magnifica* (votes, unanimous), from Messrs. Cocker, Aberdeen. A very fine hardy plant, producing an abundance of very pretty light-bluish flowers suitable for cutting. The blooms measure 3 inches across, and are supported on very strong and stiff stems. The pale violet-mauve anthers contrast very pleasingly with the general colour.

The above awards to Dahlias were made by a Joint Committee of members of the R.H.S. Floral Committee and members of the National Dahlia Society.

Other Exhibits.

Mme. La Duchesse Sarah Burgess, Beddington : Petunias.

Mr. W. F. Hamilton, Lymington : *Crotalaria agatiflora*.

Messrs. S. Low, Bush Hill Park : *Chironia ixifera*.

Messrs. Van Meerbeek, Hillegom : Gladiolus 'White Giant.'

Mr. A. Perry, Enfield : Achilleas and Delphiniums.

Major Pitt, Charing : Carnation 'Mrs. Inez Pitt.'

Mr. G. Reuthe, Keston : hardy plants.

Mr. J. B. Riding, Chingford : Dahlia 'Countess Beauchamp.'

Mr. N. C. Shiach, Helensburgh : *Spartium junceum*.

Messrs. Stredwick, St. Leonards : Dahlias.

Messrs. J. Veitch, Chelsea : Streptocarpus.

Wargrave Plant Farm, Twyford : *Gentiana Kurroo*.

Miss Willmott, F.L.S., Great Warley : *Origanum Tournefortii*.

FLORAL COMMITTEE, AUGUST 29, 1913.

SUB-COMMITTEE AT WISLEY.

Mr. H. B. MAY, V.M.H., in the Chair, and seven members present.

Awards Recommended :—

Award of Merit.

To the following Antirrhinums :

Nos. 3, 4, 'Amber Queen' ; No. 12, 'Beacon' ; No. 13, 'Beauty' ; Nos. 17, 18, 'Bonfire' ; No. 37, 'Carmine Queen' ; No. 41, 'Coccinea' ; No. 56, 'Crimson King' ; No. 67, 'Daphne' ; No. 69, 'Defiance' ; No. 80, 'Fire King' ; No. 89, 'Golden Morn' ; No. 90, 'Golden Queen' ; No. 104, 'Maize Queen' ; No. 111, 'Moonlight' ; No. 122, 'Pink' ; No. 135, 'Queen Victoria' ; No. 149, 'Rosy Morn' ;

No. 151, 'Salmon Pink'; No. 164, 'Sunset'; No. 178, 'White Beauty'; No. 182, 'White Queen'; No. 185, 'Yellow'; No. 186, 'Yellow King'; No. 193, 'Yellow Queen.'

Highly Commended.

No. 1, 'Albino'; No. 21, 'Brilliant'; No. 24, 'Brilliant Rose'; No. 30, 'Buff Queen'; No. 45, 'Coral Red'; No. 58, 'Dainty'; No. 63, 'Dainty Queen'; No. 82, 'Firelight'; No. 83, 'Galatea'; No. 112, 'Nobile'; No. 126, 'Pink Beauty'; No. 128, 'Pink Queen'; No. 145, 'Roseum'; No. 156, 'Scarlet Carmine'; No. 183, 'White Queen'; No. 189, 'Yellow Prince.'

For descriptions see Reports of the Wisley Trials.

ORCHID COMMITTEE.

MAY 14, 1913.

Mr. J. GURNEY FOWLER in the Chair, and eleven members present.

Awards Recommended :—

Silver Flora Medal.

To Sir Geo. H. Kenrick, Whetstone, Edgbaston, Birmingham (gr. Mr. Macdonald), for finely-flowered plants of *Dendrobium Dalhousieanum* propagated from a small original plant.

Award of Merit.

To *Brassolaeliocattleya* × *Veitchii*, The Dell variety (*B.-c.* × *Digbyano-Mossiae* × *L. purpurata*) (votes unanimous), from Baron B. Schröder (gr. Mr. J. E. Shill). Sepals and petals silver-white, tinged with rose. Lip broad, fringed, deep rose-purple, with yellow disc.

To *Laeliocattleya* × *Fascinator-Mossiae*, Burford variety (*L.-c.* × 'Fascinator' × *C. Mossiae*) (votes unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O., Burford (gr. Mr. W. H. White). Flower of good shape, white, with the front of the lip violet-purple, and a spot of the same colour on the tips of the petals.

To *Odontoglossum* × 'Phoebe' *splendens* (*cirrhosum* × *crispum*) (votes unanimous), from Messrs. McBean, Cooksbridge. A large form with white flowers blotched with red.

Botanical Certificate.

To *Lissochilus streptopetalus*, from William Van de Weyer, Esq., Corfe Castle. The plant bore eight spikes 4 feet high, with numerous yellow flowers with greenish sepals striped with brown. Collected in N'gongo Hills, British East Africa, alt. 8300 feet. Figured as *Eulophia streptopetala*.

Cultural Commendation.

To Mr. C. J. Salter, gr. to the Right Hon. Lord Lawrence, Chetwode Manor, Buckingham, for *Dendrobium Dalhousieanum* with many spikes.

To Mr. Macdonald, gr. to Sir Geo. H. Kenrick, Whetstone, Birmingham, for *Dendrobium Dalhousieanum*.

To Mr. Branch, gr. to W. R. Lee, Esq., Heywood, for *Dendrobium Falconeri* with 200 flowers.

To Mr. W. H. White, Orchid grower to Sir Trevor Lawrence, Bart., for a finely flowered *Brassocattleya* × *nivalis*.

Other Exhibits.

Sir Trevor Lawrence, Bart., K.C.V.O. : rare hybrids.

Pantia Ralli, Esq. : *Odontioda* × *Sanderae*.

W. R. Lee, Esq. : *Cypripedium* × 'Pavlova.'

A. Harrison, Esq. : *Odontoglossums*.
 The Liverpool Horticultural Co. : group.
 Messrs. McBean : *Odontiodas*.

ORCHID COMMITTEE, MAY 20, 1913.

AT CHELSEA.

Sir HARRY J. VEITCH in the Chair, and twenty-three members present.

[For Cups and Medals awarded by the Council after consultation with the Judges, see p. xciv.]

Awards Recommended :—

First-class Certificate.

To *Odontoglossum* × 'Othmarschen' (parentage unrecorded) (votes 14 for, 6 against), from Baron Bruno Schröder, The Dell, Englefield Green (gr. Mr. J. E. Shill). Flowers large and of fine shape, bearing large claret blotches, the white ground colour appearing in thin wavy lines. (Fig. 150.)

To *Laeliocattleya* × 'Britannia,' Westonbirt variety (*L.-c.* × *Canhamiana* × *C. Warszewiczii*) (votes, 10 for, 3 against), from Lieut.-Colonel Sir George L. Holford, K.C.V.O. (gr. Mr. H. G. Alexander). Sepals and petals rosy-lilac, the trumpet-shaped labellum claret-red.

To *Odontoglossum* × 'Queen of Gatton' (*triumphans* × *percultum*) (votes, unanimous), from Sir Jeremiah Colman, Bart., Gatton Park (gr. Mr. Collier). Flowers large and finely formed, yellow, closely blotched with red-brown. (Fig. 151.)

To *Laeliocattleya* × 'Frederick Boyle,' Gatton variety (*L. anceps* 'Stella' × *C. Trianae*) (votes, unanimous), from Sir Jeremiah Colman, Bart. Flower blush-white. Near to the variety *Kerchoveae*.

To *Odontioda* × 'Chanticleer,' Orchidhurst variety (*Odontioda* × *Cooksoniae* × *C. Noezliana*) (votes, unanimous). A brilliant scarlet flower of fine shape. (Fig. 152.)

To *Laeliocattleya* × 'Sylvia' var. 'Princess Victoria Louise' ('*Ascania*' × '*Hippolyta Phoebe*') (votes, unanimous), from Messrs. Charlesworth. Sepals and petals chrome-yellow. Front of lip rosy-crimson.

To *Miltonia* × *Charlesworthii* (*vexillaria* 'Memoria G. D. Owen' × *Hyeana*) (votes, unanimous), from Messrs. Charlesworth. Practically a large rose-pink form of 'G. D. Owen.'

To *Cattleya* × 'Empress Frederick' *alba* (*Dowiana aurea* × *Mossiae Reineckiana*) (votes, unanimous), from Messrs. Mansell and Hatcher, Rawdon, Yorks. Flowers white, with deep yellow labellum.

Award of Merit.

To *Laeliocattleya* × 'Ganymede,' Holford's variety (*L.* × '*Latona*' × *C. Schroderae*) (votes, unanimous), from Lieut.-Colonel Sir George L. Holford, K.C.V.O. Flowers copper-yellow, with ruby front to the lip.

To *Odontoglossum* × *illustrissimum*, Westonbirt variety (*Lambeauianum* × *ardentissimum*) (votes, unanimous), from Lieut.-Col. Sir Geo. L. Holford, K.C.V.O. The large blooms were claret colour with a gold tint and blush-white tips to the segments.

To *Odontoglossum* × *eximium Armstrongiae* (*ardentissimum* × *crispum*, blotched variety) (votes, unanimous), from Messrs. Armstrong & Brown, Tunbridge Wells. A model flower, white, with the inner halves of the segments deep violet.

To *Odontoglossum* × *Georgius Rex* (parentage unrecorded) (votes, unanimous), from Messrs. Charlesworth. Flowers heavily blotched with claret colour, margin white.

To *Laeliocattleya* × 'Aphrodite,' Orchidhurst variety (*L. purpurata* × *C. Mendelii*) (votes, unanimous), from Messrs. Armstrong & Brown. Flowers rose-pink with rich, ruby-crimson lip.

To *Brassolaeliocattleya* × *excelsior* (*L.-c.* × 'Geo. Woodhams' × *B. Digbyana*), from Messrs. Armstrong & Brown. Lip deep claret-crimson, petals rose colour.

To *Oncidium* × *McBeanianum* (*superbiens* × *macranthum*) (votes, unanimous), from Messrs. McBean, Cooksbridge. An interesting cross. Sepals olive-brown, petals yellow spotted with red-brown.

To *Odontioda* × *Charlesworthii* var. 'Perfection' (*O. Harryanum* × *C. Noezliana*) (votes, 13 for, 1 against), from Messrs. McBean. Flower large, dark red.

To *Brassocattleya* × *Vilmoriniana* var. 'Etna' (*B.-c.* × 'Mrs. J. Leemann' × *C. Mossiae*) (votes, 15 for, 1 against), from Messrs. Sander, St. Albans. Sepals and petals rose, white at the base. Lip fringed, tinged with lilac.

To *Odontonia* × 'Laelia Sander' (*Miltonia Warscewiczii* × *Odontoglossum* × *amabile*) (votes, unanimous), from Messrs. Sander. Inflorescence erect, branched, flowers reddish purple, the outer parts of the segments blush-white.

To *Oncidioida* × *Cooksoniae illustris* (*O. macranthum* × *C. Noezliana*) (votes, 14 for, 2 against), from Messrs. Sander. Flowers as large as those of *Oncidium macranthum*. Dark red.

To *Odontioda* × *chelseiensis* var. 'St. Fuscien' (*C. vulcanica* × *O. crispum*) (votes, 10 for, 3 against), from Monsieur H. Graire, Amiens. A larger rosy-lilac form of the type shown in 1909.

Cultural Commendation.

To Mr. H. G. Alexander, Orchid grower to Lieut.-Col. Sir Geo. L. Holford, K.C.V.O., for specimens of *Miltonia vexillaria* 'Snowflake' (15 spikes, 85 flowers), and *M. vexillaria virginale* with 25 blooms.

To Mr. H. G. Alexander for a fine specimen of *Cattleya Mossiae* 'Mahomet.'

To Mr. J. Davis, gr. to J. Gurney Fowler, Esq., for *Sobralia macrantha alba* with 45 large white flowers.



FIG. 153.—MILTONIODA \times HARWOODII, FOWLER'S VARIETY. (p. clix.)

[To face p. clvi.]

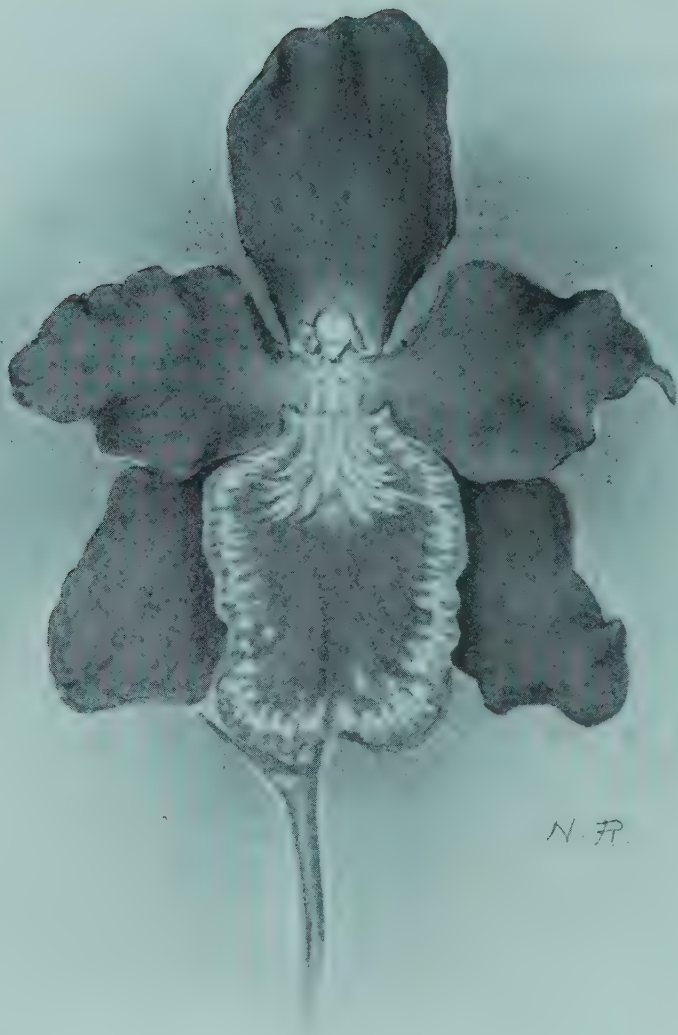


FIG. 154.—*ODONTIODA* × *BREWII*. (p. clix.)

Other Exhibits.

Lieut.-Col. Sir Geo. L. Holford : hybrids.

Sir Jeremiah Colman, Bart. : *Odontiodas*.

W. P. Burkinshaw, Esq., Hessle, Hull : *Miltonia* × *Bleuana* and white *Cattleya Luddemanniana*.

Mr. John Evans, Congleton : two new *Odontoglossums*.

Monsieur Jules Hye de Crom, Ghent : hybrid *Miltonia*.

ORCHID COMMITTEE, JUNE 3, 1913.

Mr. J. GURNEY FOWLER in the Chair, and twenty-two members present.

Awards Recommended :—*Gold Medal.*

To H. S. Goodson, Esq., Fairlawn, Putney (gr. Mr. G. E. Day), for a very fine group.

Silver Flora Medal.

To Messrs. Armstrong & Brown, Tunbridge Wells, for showy hybrids, and rare species.

To Messrs. Sander, St. Albans, for *Odontoglossums*, *Cattleyas* and *Laeliocattleyas*.

Silver Banksian Medal.

To E. H. Davidson, Esq., Twyford, for rare Orchids.

To Messrs. J. Cypher, Cheltenham, for a group.

To Messrs. Charlesworth, Haywards Heath, for rare species and hybrids.

To Messrs. Stuart Low, Enfield, for a group.

To Messrs. Hassall, Southgate, for a group.

Bronze Banksian Medal.

To Messrs. W. Baylor Hartland, Cork, for a small group.

Award of Merit.

To *Odontoglossum* × 'Aireworth,' Orchid Dene variety (*crispum* × *Lambeauianum*) (votes, unanimous), from E. H. Davidson, Esq., Orchid Dene, Twyford. Flower large and finely formed, the inner parts of the segments blotched dark red, the outer coloured rose. Lip white with red markings.

To *Odontoglossum* × *Lairessei* (*Edwardii* × *Cervantesii*) (votes, unanimous), from Sir Trevor Lawrence, Bart., K.C.V.O. (gr. Mr. W. H. White). Inflorescence branched, flowers claret-red with white tips.

To *Odontoglossum* × 'Neptune' var. 'St. Fuscien' (*crispum* × *nebulosum*) (votes, 15 for, 1 against), from Monsieur H. Graire, Amiens. Flowers white, effectively blotched with purple.

Cultural Commendation.

To Mr. W. Smith, gr. to Albert Pam, Esq., Malting Farm, Little Hallingbury, Bishop Stortford, for a fine specimen of *Cattleya Mossiae* with about 100 flowers and buds.

To Mr. W. H. White, Orchid grower to Sir Trevor Lawrence, Bart., K.C.V.O., for *Epidendrum organense* with 18 tufts of small flowers.

Other Exhibits.

Sir Jeremiah Colman, Bart. : *Catasetums*.

Sir Trevor Lawrence, Bart., K.C.V.O. : *Laeliocattleyas*.

Francis Wellesley, Esq. : *Laeliocattleya* × 'Lady Roberts' (*L.-c.* 'Euphrosyne' × *C. Dowiana aurea*).

Pantia Ralli, Esq. : *Odontoglossum* × 'Aireworth.'

Ernest G. Mocatta, Esq. : *Odontoglossum* × 'Jasper.'

J. Gurney Fowler, Esq. : *Odontoglossum crispum* 'Ruth.'

R. Brooman White, Esq. : *Odontoglossums*.

Mr. H. Dixon : *Cattleya Mossiae imperialis*.

Mr. C. F. Waters : *Cattleyas*.

ORCHID COMMITTEE, JUNE 17, 1913.

Mr. J. GURNEY FOWLER in the Chair, and twenty-one members present.

Awards Recommended :—

Silver Banksian Medal.

To H. S. Goodson, Esq., Putney (gr. Mr. G. E. Day), for hybrid *Odontoglossums*.

To Mr. S. W. Flory, Tracy's Orchid Nursery, Twickenham, for showy *Cattleyas* and *Laeliocattleyas*.

To Messrs. Charlesworth, Hayward's Heath, for a group.

To Messrs. Stuart Low, Enfield, for a group.

To Messrs. Hassall, Southgate, for *Cattleyas*.

Award of Merit.

To *Odontoglossum crispum* 'The Baroness' (votes, unanimous), from Baron Bruno Schröder, The Dell, Englefield Green (gr. Mr. J. E. Shill). One of the largest and most perfectly shaped forms. Flowers white, blotched with light violet and tinged with purple at the back.

To *Cattleya Gaskelliana* 'Fairy Queen' (votes, unanimous), from Baron Bruno Schröder. A clear white variety, with yellow disc to the lip, in front of which is a faint pearly flush.

To *Oncidioda* × 'Bella' (*Oncidium Marshallianum* × *Cochlioda Noezliana*) (votes, unanimous), from Messrs. Charlesworth. An interesting hybrid with the form and colouring of *Oncidium Marshallianum*—yellow, with red-brown markings on the inner parts of the segments.

Cultural Commendation.

To Mr. W. H. White, Orchid grower to Sir Trevor Lawrence, Bart., K.C.V.O., for a fine specimen of *Dendrobium Victoriae-reginae* with many blue and white flowers.

To Mr. J. Davis, gr. to J. Gurney Fowler, Esq., for *Odontioda* × *Cooksoniae*, Fowler's variety.

Other Exhibits.

Baron Bruno Schröder: two fine forms of *Cattleya Warscewiczii*.

J. Gurney Fowler, Esq.: *Lycaste* × *Imschootiana* (*cruenta* × *Skinneri*).

Francis Wellesley, Esq.: *Cattleya Mendelii* 'His Majesty the King.'

Sir Mervyn Buller: *Laeliocattleya* × *Martinetii*.

Mr. E. V. Low: *Cattleyas* and *Laeliocattleyas*.

ORCHID COMMITTEE, JULY 1, 1913.

AT HOLLAND HOUSE.

Sir HARRY J. VEITCH in the Chair, and twenty-six members present.

[For Cups and Medals awarded by the Council after consultation with the judges, see p. cii.]

Awards Recommended:—*First-class Certificate.*

To *Miltonioda* × *Harwoodii*, Fowler's variety (*Miltonia vexillaria* 'Empress Augusta Victoria' × *Cochlioda Noezliana*) (votes, unanimous), from J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis). Flowers twice the size of those of the variety which secured an Award of Merit October 8, 1912; bright cerise-rose, with yellow crest to the lip. (Fig. 153.)

To *Miltonia* × *Sanderæ* (St. André' × *vexillaria* 'Memoria G. D. Owen') (votes, unanimous), from Messrs. Sander, St. Albans. A clear white flower with a delicate rose-pink flush, and a nearly black mask at the base of the lip.

To *Odontioda* × *Brewii* (*Odontioda Charlesworthii* × *Odontoglossum Harryanum*) (votes, 13 for, 0 against), from Messrs. Charlesworth, Haywards Heath. Flower larger than *O. Charlesworthii*, dark bronzy-red with a yellow crest of seven ridges. (Fig. 154.)

Award of Merit.

To *Cattleya Mossiæ* 'Dreadnought' (votes, unanimous), from Messrs. Sander. A massive flower with petals 4 inches in width, deep rose-pink, with violet-purple veining and blotching on the lip.

To *Cattleya Mossiæ* 'Olympia' (votes, 12 for, 3 against), from

Messrs. Charlesworth. Sepals and petals blush-white, tinged and veined rose. Lip broad, mottled with purple.

To *Odontioda* × *Wilsonii* 'The President' (*Cochlioda vulcanica* × *Odontoglossum Pescatorei*) (votes, unanimous), from Messrs. Charlesworth. Habit of *O. Pescatorei*. Inflorescence branched. Flowers white, densely spotted with purple.

To *Cattleya* × 'Magnet' var. 'Serenata' (*Whitei* × *Mossiae*) (votes, 9 for, 2 against), from Messrs. Mansell & Hatcher. Flowers resembling *C. labiata*, rose, with reddish-purple front to the lip.

Cultural Commendation.

To Messrs. Charlesworth, for *Grammangis Ellisii* with two spikes of sixty-four flowers.

To Mr. Collier, gr. to Sir Jeremiah Colman, Bart., for *Odontioda* × *Bradshawiae* with two branched spikes of dark scarlet flowers.

Other Exhibits.

Sir Jeremiah Colman, Bart. : *Sobralia Colmanae*.

J. Gurney Fowler, Esq. : *Odontioda Lambeauiana*.

Monsieur Jules Hye de Crom : hybrid Miltonias.

W. Waters Butler, Esq. : Cattleyas.

Messrs. Jas. Veitch : hybrid Orchids.

Mr. E. V. Low : *Cattleya Mendelii Lambeauiana*.

Messrs. Sander : new hybrids.

ORCHID COMMITTEE, JULY 15, 1913.

Mr. J. GURNEY FOWLER in the Chair, and twenty members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Sander, St. Albans, for a group, principally of interesting species.

To Messrs. Charlesworth, Haywards Heath, for a group.

To Messrs. Stuart Low, Enfield, for a group.

First-class Certificate.

To *Dendrobium Dearei*, McBean's variety (votes, 14 for, 1 against), from Messrs. McBean, Cooksbridge. Flowers much larger than the ordinary form ; snow-white.

Award of Merit.

To *Odontioda* × *Thwaitesii* 'Purple Emperor' (*O. Harryanum* × *C. vulcanica*) (votes, 15 for, 2 against), from E. H. Davidson, Esq., Orchid Dene, Twyford. Flowers large and with broad segments, bronzy-purple, with white freckling on the lip.

To *Odontioda* × *Cooksoniae venusta* (*O.* × *ardentissimum* × *C. Noezliana*) (votes, unanimous), from Lieut.-Col. Sir Geo. L. Holford, K.C.V.O., Westonbirt (gr. Mr. H. G. Alexander). A large brilliant red flower of fine shape. Front of the lip blush-white, crest yellow.

To *Paphinia cristata* (votes, unanimous), from Messrs. Charlesworth. Plant dwarf with short spikes of one or two flowers, each 4 inches across, claret-red, with white lines and a tuft of white hairs on the lip. First introduced from Brazil 1843. It is placed by some authorities under *Lycaste*.

Other Exhibits.

Sir Jeremiah Colman, Bart., V.M.H. : rare Orchids.

E. de Q. Quincey, Esq. : *Cypripedium Wiertzianum*.

The Earl of Craven : *Laeliocattleya* × *Martinetii*.

Monsieur H. Graire : *Odontioda* hybrid.

ORCHID COMMITTEE, JULY 29, 1913.

Mr. J. GURNEY FOWLER in the Chair, and twenty members present.

Awards Recommended :—

Silver Banksian Medal.

To Messrs. Sander, St. Albans, for rare species.

To Messrs. Charlesworth, Haywards Heath, for well-grown specimens.

Bronze Banksian Medal.

To Messrs. Jas. Veitch, Chelsea, for a group of scarlet *Disa grandiflora* raised from seeds sown three years ago.

To Messrs. Hassall, Southgate, for hybrids.

To R. G. Thwaites, Esq., Streatham (gr. Mr. J. M. Black), for a group.

Award of Merit.

To *Miltonia* × *Charlesworthii* 'Mrs. Ralli' (*vexillaria* 'Memoria G. D. Owen' × *Hyeana*) (votes, 8 for, 3 against), from Pantia Ralli, Esq., Ashted Park, Surrey. Flowers white, tinged with pink and with a maroon-coloured mask on the lip.

To *Odontoglossum* × 'Queen Alexandra' var. 'Theodora' (*Harryanum* × *triumphans*) (votes, 12 for, 3 against), from de B. Crawshay, Esq., Rosefield, Sevenoaks. The largest form of this showy hybrid, having flowers nearest to *O. Harryanum*. Sepals and petals yellow, blotched with chestnut-red. Lip white, with violet markings.

Cultural Commendation.

To Mr. W. H. White, Orchid grower to Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H., for a basket of 20 plants of the orange-red *Habenaria rhodochila*.

To Messrs. Charlesworth for *Angraecum Eichlerianum* with 15 flowers.

Other Exhibits.

Sir Jeremiah Colman, Bart., V.M.H. : rare Orchids.

Pantia Ralli, Esq. : *Odontiodas* and *Odontoglossum eximium* var.

Sir Trevor Lawrence, Bart., K.C.V.O., V.M.H. : *Maxillaria fractiflexa* and other fine species.

de B. Crawshay, Esq. : *Odontioda* × 'Desdemona' (*C. Noezliana* × *O.* × 'Othello').

Messrs. Manda, St. Albans : Cattleyas.

ORCHID COMMITTEE, AUGUST 12, 1913.

Mr. J. GURNEY FOWLER in the Chair, and fourteen members present.

Awards Recommended :—

Silver Flora Medal.

To E. H. Davidson, Esq., Orchid Dene, Twyford, for choice hybrids.

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for rare Orchids.

To Messrs. McBean, Cooksbridge, for a group.

To H. T. Pitt, Esq., Stamford Hill (gr. Mr. Thurgood), for a group.

Award of Merit.

To *Laeliocattleya* × *Wellesleyi* var. 'Flambeau' (*C. Warscewiczii* × *L.-c.* × *Martinetii*) (votes, unanimous), from E. H. Davidson, Esq., Twyford. A very handsome *Laeliocattleya*, with a strong indication of *Cattleya Warscewiczii* in the ample labellum. Sepals and petals bright purplish-rose, with a golden tint. Lip deep crimson, darker in the centre, and with fine gold lines from the base.

Cultural Commendation.

To Messrs. Charlesworth for a large specimen of *Cryptophoranthus Dayanus* with about 150 flowers.

Other Exhibits.

R. G. Thwaites, Esq. : *Odontiodas*.

Messrs. Armstrong & Brown : *Dendrobium Hookerianum*.

de B. Crawshay, Esq. : *Odontoglossum* × 'Queen Alexandra' and *Odontioda* × *Leeana*.

Mr. E. V. Low : *Laeliocattleya* × 'Ophir,' E. V. Low's variety.

Messrs. Sander : *Laeliocattleya* × 'Phoenix' var. 'King George.'

Messrs. Stuart Low : various showy Orchids.

ORCHID COMMITTEE, AUGUST 26, 1913.

Mr. J. GURNEY FOWLER in the Chair, and fourteen members present.

Awards Recommended :—

Silver Flora Medal.

To Messrs. Jas. Veitch, Chelsea, for *Laeliocattleyas*, &c.

To Messrs. Armstrong & Brown, Tunbridge Wells, for handsome hybrids.

To Messrs. Sander, St. Albans, for hybrids and rare species.

Silver Banksian Medal.

To Messrs. Charlesworth, Haywards Heath, for finely grown Orchids.

To Messrs. Hassall, Southgate, for a group.

To H. T. Pitt, Esq., Rosslyn, Stamford Hill (gr. Mr. Thurgood), for a group.

First-class Certificate.

To *Odontonia* × *brugensis* 'Eileen' (*Odontoglossum Edwardii* × *Miltonia vexillaria* 'Memoria G. D. Owen') (votes, unanimous), from J. Gurney Fowler, Esq., Glebelands, South Woodford (gr. Mr. J. Davis). A very remarkable hybrid, with the flowers flatly arranged as in *Miltonia*. Spike erect, bearing six flowers, of a clear lilac-purple colour, with a narrow silvery margin to the segments, and an oblong dark red blotch in front of the yellow crest. (Fig. 155.)

To *Brassolaeliocattleya* × 'The Baroness' (*B.-c.* × 'Mrs. J. Leemann' × *L.-c.* × 'Ophir') (votes, unanimous), from Baron Bruno Schröder, The Dell, Englefield Green (gr. Mr. J. E. Shill). Flowers large and well expanded, clear light yellow, with a rose-coloured blotch in the front of the fringed lip.

Award of Merit.

To *Laeliocattleya* × 'Marquis de Wavrin,' Orchidhurst variety (*L.-c.* × *elegans* × *C.* × *Hardyana*) (votes, unanimous), from Messrs. Armstrong & Brown, Tunbridge Wells. Flowers of fine shape and substance. Sepals and petals purplish-rose. Lip claret-crimson, with gold markings at the base.

To *Laeliocattleya* × 'Olenus' var. 'Ettrick' (*L.-c.* × *bletchleyensis* × *C. Dowiana aurea*) (votes, 9 for, 2 against). An improvement on others of its class. Sepals and petals tinged and veined with light purple. Lip broad, claret-crimson.

To *Cattleya* × *Hardyana* 'Mrs. Waters Butler' (*Warscewiczii* × *Dowiana aurea*) (votes, 11 for, 1 against), from W. Waters Butler, Esq., Southfield, Edgbaston (gr. Mr. R. H. Jones). Lip bright chrome-yellow, with purple front. Sepals and petals tinged and veined with rose-purple. (Fig. 156.)

Cultural Commendation.

To Mr. Collier, gr. to Sir Jeremiah Colman, Bart., for a large specimen of *Ornithidium Sophronitis* with many flowers.

Other Exhibits.

Sir Jeremiah Colman, Bart. : rare species.

Pantia Ralli, Esq. : *Odontioda* × 'Euterpe.'

H. S. Goodson, Esq. : *Cattleya* × *Hardyana Goodsonae*.

NARCISSUS AND TULIP COMMITTEE.

MARCH 4, 1913.

Mr. E. A. BOWERS, M.A., F.E.S., F.L.S., in the Chair, and twenty-two members present.

Messrs. Manger, Guernsey, exhibited flowers under the name of *Narcissus edorus Campanella rugulatus*, and asked whether the variety was identical with *N. edorus rugulatus maximus*. The Committee considered it to be a large form of *N. edorus Campanella*.

The subject of registration was discussed, and it was agreed "that no name of a Daffodil shall be registered unless the classification of the variety be given at the same time." It was further agreed that in future editions of the "Daffodil List" the names of unclassified Daffodils shall be placed together at the end of the classified varieties.

Awards Recommended :—

Silver-gilt Banksian Medal.

To Mr. Christopher Bourne, Bletchley, for a group of Daffodils.

Silver Flora Medal.

To Messrs. Barr, Covent Garden, for Daffodils.

To Messrs. Cartwright and Goodwin, Kidderminster, for Daffodils.

Silver Banksian Medal.

To Messrs. J. R. Pearson, Lowdham, Notts, for a group of Daffodils.

To Messrs. Walter T. Ware, Inglescombe, Bath, for newer Daffodils in pots.

Other Exhibits.

Messrs. R. H. Bath, Wisbech ; Daffodils and Tulips.

Messrs. Robert Sydenham, Birmingham ; Daffodils.

NARCISSUS AND TULIP COMMITTEE, MARCH 18, 1913.

Rev. G. H. ENGLEHEART, V.M.H., in the Chair, and eighteen members present.

The Publications Sub-Committee briefly outlined a proposed scheme for the "Daffodil Year Book," and this was approved, Messrs. P. R. Barr and G. W. Leak being added to the Sub-Committee.

A discussion took place concerning the advisability of granting awards to Daffodils suitable for various special purposes, as it was felt that the high standard of form now required excluded many excellent Daffodils from all possibility of awards. Eventually Messrs.



FIG. 100.—*Cyclopogon* / *maculatus* (L.) Benth. in 1844.

(Drawing from)

W. T. Ware, W. A. Watts, P. R. Barr, J. D. Pearson, and G. W. Leak were appointed to draw up a scheme of awards for the consideration of the Committee; the Rev. J. Jacob to be convener.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Cuthbert, Southgate, for Tulips in pots.

To Messrs. Barr, Covent Garden, for Daffodils.

Silver-gilt Banksian Medal.

To Messrs. Cartwright and Goodwin, Kidderminster, for Daffodils.

Silver Banksian Medal.

To Mr. Christopher Bourne, Bletchley, for Daffodils.

Bronze Flora Medal.

To Mr. F. Herbert Chapman, Rye, for new Daffodils.

To Messrs. Robert Sydenham, Birmingham, for Daffodils.

To Messrs. Bath, Wisbech, for Daffodils and Tulips.

Other Exhibits.

Rev. G. H. Engleheart, V.M.H., Dinton, Salisbury; new Daffodils.

Mr. Alex. Wilson, Shovel, Bridgwater; new Daffodils.

Miss V. Warren, Westbere, Canterbury; seedling Daffodils.

Mr. W. A. Watts, St. Asaph; seedling Daffodils.

NARCISSUS AND TULIP COMMITTEE, APRIL 1, 1913.

MR. J. T. BENNETT PÖE, V.M.H., in the Chair, and twenty-six members present.

A scheme for granting Awards to Daffodils for special purposes, such as garden decoration, &c., was submitted and discussed at considerable length. It was subsequently referred back to the Sub-Committee for further consideration in connexion with the various points raised.

The death of Mr. Andrew Kingsmill was reported, and the Committee desired that a letter of condolence be sent to Mrs. A. Kingsmill and family.

The Committee recommended to the Council that the meetings of the Narcissus and Tulip Committee commence at 11 A.M. in 1914.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Barr, Covent Garden, for Daffodils, including many new varieties.

To Mr. Alex. Wilson, Shovel, Bridgwater, for new Daffodils.

Silver-gilt Banksian Medal.

To Mr. Christopher Bourne, Bletchley, for Daffodils.

To Messrs. Cuthbert, Southgate, for a large group of Tulips.

Silver Flora Medal.

To Messrs. Cartwright and Goodwin, Kidderminster, for Daffodils.
To Mr. F. Herbert Chapman, Rye, for Daffodils.

Silver Banksian Medal.

To Messrs. Bath, Wisbech, for Daffodils and Tulips.
To Messrs. Robert Sydenham, Birmingham, for Daffodils.
To Mr. A. Watts, St. Asaph, for new Daffodils.

Bronze Flora Medal.

To Lissadell Bulb Farm, Sligo, for Irish-grown Daffodils.

Award of Merit.

To Narcissus 'White Emperor' (votes, unanimous), a fine white variety difficult to classify, as it appeared to be on the border line between the Trumpet and the *Incomparabilis* sections; from Messrs. Cartwright and Goodwin.

Other Exhibits.

Rev. G. H. Engleheart, Dinton, Salisbury; new Daffodils.
Wargrave Plant Farm, Ltd., Liverpool Street, E.C.; Tulips and Daffodils.

Miss V. Warren, Westbere, Canterbury; seedling Daffodils
Mrs. R. O. Backhouse, Hereford; seedling Daffodils.

NARCISSUS AND TULIP COMMITTEE, APRIL 15, 1913.

Mr. WALTER T. WARE in the Chair, and twenty-three members present.

It was reported that the Rev. Joseph Jacob had been appointed Editor of the material for the proposed "Daffodil Year Book."

Barr Memorial Cup.

To Mr. P. Rudolph Barr for the year 1913-14.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. Barr, Covent Garden, for Daffodils and Tulips.
To Mr. Alex. Wilson, Shovel, Bridgwater, for new Daffodils.

Silver-gilt Banksian Medal.

To Mr. Christopher Bourne, Bletchley, for Daffodils and Tulips.
To Messrs. Cuthbert, Southgate, for Tulips.

Silver Flora Medal.

To Mr. F. Herbert Chapman, Rye, for Daffodils.

Silver Banksian Medal.

To Messrs. Bath, Wisbech, for Daffodils and Tulips.
To Mr. W. A. Watts, St. Asaph, for Daffodils.
To Messrs. Robert Sydenham, Birmingham, for Daffodils.
To Messrs. Cartwright and Goodwin, Kidderminster, for Daffodils.

Bronze Flora Medal.

To Lissadell Bulb Farm, Sligo, for Daffodils.

First-class Certificate.

To Narcissus 'Mrs. Ernst Krelage' (votes, 17 for, 0 against), from Messrs. E. H. Krelage, Haarlem, Holland. This fine white Trumpet variety gained an Award of Merit in 1912.

Award of Merit.

To Narcissus 'Europa' (votes, 10 for, 5 against), from Messrs. Walter T. Ware, Inglescombe, Bath.

To Narcissus 'St. Olaf' (votes, 18 for, 0 against), from Messrs. Barr, Covent Garden.

To Narcissus 'Cædmon' (votes, 15 for, 0 against), from Messrs. Barr, Covent Garden.

Other Exhibits.

Mr. H. Hemsley, Crawley ; Daffodils.

Messrs. Jas. Veitch, Chelsea ; Daffodils.

NARCISSUS AND TULIP COMMITTEE, APRIL 29, 1913.

Mr. WALTER T. WARE in the Chair, and fifteen members present.

Mr. P. R. Barr brought forward the Sub-Committee's scheme of awards to Daffodils suitable for garden decoration, &c. ; this was approved, and it was agreed that it be sent as a recommendation to the Council.

Awards Recommended :—*Silver-gilt Banksian Medal.*

To Messrs. Barr, Covent Garden, for Daffodils and Tulips.

To Messrs. Cuthbert, Southgate, for Darwin Tulips.

Silver Flora Medal.

To Messrs. Bath, Wisbech, for Daffodils and Tulips.

Silver Banksian Medal.

To Messrs. Sutton, Reading, for Daffodils.

To Messrs. Cartwright and Goodwin, Kidderminster, for Daffodils.

Award of Merit.

To Narcissus 'Evangeline' (votes, 12 for, 2 against), a beautiful Leedsii form, from Mr. H. N. Phillips, Olton.

To Narcissus 'Venetia' (votes unanimous), a lovely and graceful white variety obtained by crossing *Narcissus calathinus* with *N. 'Minnie Hume'* ; from Mr. W. B. Cranfield, Enfield Chase.

Other Exhibits.

Messrs. Jas. Veitch, Chelsea ; Daffodils and Tulips.

NARCISSUS AND TULIP COMMITTEE, MAY 14, 1913.

Mr. E. A. BOWLES, M.A., F.E.S., F.L.S., in the Chair, and twelve members present.

Awards Recommended :—

Silver-gilt Flora Medal.

To Messrs. James Carter, Raynes Park, Surrey, for a group of Darwin Tulips.

To Messrs. Hogg and Robertson, Mary Street, Dublin, for a group of Darwin Tulips.

To Messrs. Sutton, Reading, for Darwin Tulips.

Silver-gilt Banksian Medal.

To Messrs. Barr, Covent Garden, for late Tulips.

To Mr. W. A. Watts, St. Asaph, for late Tulips.

Silver Flora Medal.

To Messrs. Cuthbert, Southgate, for Tulips.

To Messrs. Wallace, Colchester, for a group of late Tulips.

Silver Banksian Medal.

To Mr. Christopher Bourne, Bletchley, for a group of Tulips.

To Messrs. Jas. Veitch, Chelsea, for a group of Tulips.

To Messrs. Dobbie, Edinburgh, for a group of Tulips.

Award of Merit.

To Darwin Tulip 'Massenet' (votes, 8 for, 1 against), from Messrs. Bath, Wisbech.

Other Exhibits.

Messrs. Fells, Letchworth, Herts ; group of Tulips.

Wargrave Plant Farm, Liverpool Street, E.C. ; group of Tulips.

ESTABLISHED
1804.

INCORPORATED
1909.

TELEGRAMS:

"HORTENSIA,
SOWEST-LONDON."



TELEPHONE:

5363 VICTORIA.

ROYAL HORTICULTURAL SOCIETY,

VINCENT SQUARE, WESTMINSTER, S.W.

NOTICES TO FELLOWS.

- | | |
|--|--|
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| 2. Letters. | 21. Trials at Wisley. |
| 3. Telephone and Telegrams. | 22. Trial Seedling Dahlias. |
| 4. Journals Wanted. | 23. Dahlia Prizes. |
| 5. Subscriptions. | 24. A National Diploma in Horticulture. |
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| 7. Privileges of Chemical Analysis. | 26. Information. |
| 8. List of Fellows. | 27. Inspection of Fellows' Gardens. |
| 9. New Fellows. | 28. Affiliation of Local Societies. |
| 10. An Appeal. | 29. Affiliated Societies Certificate Cards. |
| 11. R.H.S. Gardeners' Diary. | 30. Rules for Judging—1914 Code. |
| 12. Lindley Library. | 31. Rules for Judging Cottage, &c., Gardens. |
| 13. The Society's Gardens at Wisley. | 32. Daffodil Year Book. |
| 14. Rock Garden at Wisley. | 33. Disbudding of Orchids. |
| 15. The Wisley Research Station. | 34. Disbudding Chrysanthemums. |
| 16. Students at Wisley. | 35. Advertisements. |
| 17. Distribution of Surplus Plants. | |
| 18. Exhibitions, Meetings, and Lectures in 1914. | |
| 19. Forced Bulb Show. | |

1. GENERAL.

Notices to Fellows are always added at the end of each number of the JOURNAL, immediately preceding the Advertisements, and also at the beginning both of the "Book of Arrangements" and of the "Report of the Council." Fellows are particularly requested to consult these Notices, as it would often save them and the Secretary much needless correspondence.

2. LETTERS.

All letters on *all* subjects should be addressed—The Secretary, Royal Horticultural Hall, Vincent Square, Westminster, S.W.

3. TELEPHONE AND TELEGRAMS.

Telephone Number : **5363 VICTORIA.**

"HORTENSIA, SOWEST-LONDON," is sufficient address for telegrams. This address counts as two words only.

4. JOURNALS WANTED.

The Secretary would be greatly obliged by the return to the Society of ANY NUMBERS of the JOURNAL which may be of no further use to Fellows. Complete sets are occasionally applied for, but, at the present moment, not even one can be supplied owing to the stock of the following being exhausted :—

VOLUME IV. Part 14.

VOLUME XIV.

VOLUME V. Part 1.

VOLUME XV. Parts 2 and 3.

VOLUME X.

VOLUME XXXVIII. Part 3.

VOLUME XIII. Part 1.

These are, therefore, particularly asked for.

5. SUBSCRIPTIONS.

All annual subscriptions are payable in advance on the 1st day of January in each year. A Fellow, if elected before the 1st of July, shall pay the annual subscription for the current year ; if elected after the 1st of July and before the 1st of October, he shall pay half a year's subscription ; if elected after the 1st of October and before the 1st of January, he shall pay at the time of his election the full amount of his subscription for the year commencing from the 1st day of January then next, and no further subscription until the next succeeding 1st of January. To avoid the inconvenience of remembering their subscriptions Fellows can *compound* by the payment of one lump sum in lieu of all further annual payments ; or they can, by applying to the Society, obtain a form of instruction to their bankers to pay for them every January 1. It may be a week or more before the Tickets reach the Fellows, owing to the very large number (over 20,000) to be despatched within the first month of the year. Fellows who have not already given an order on their bankers for the payment of their subscriptions each year are requested to do so, as this method of payment is preferred, and saves the Fellows considerable trouble. Fellows whose subscriptions remain unpaid are debarred from all the privileges of the Society ; but their subscriptions are nevertheless recoverable at law, the Society being incorporated by Royal Charter.

In paying their subscriptions, Fellows often make the mistake of drawing their cheques for Pounds instead of for Guineas. Kindly note that in all cases it is Guineas, and not Pounds. Cheques and Postal Orders should be made payable to "The Royal Horticultural Society," and crossed "London County and Westminster Bank Victoria Branch, S.W."

6. FORM OF BEQUEST.

I give and bequeath to the Treasurer for the time being of the Royal Horticultural Society, London, the sum of £....., to be paid out of such part of my personal estate as I can lawfully charge with the payment of such legacy, and to be paid free of legacy duty, within six months of my decease ; the receipt of such Treasurer to be a sufficient discharge for the same. And I declare that the said legacy shall be applied towards [the general purposes of the Society].*

7. PRIVILEGES OF CHEMICAL ANALYSIS.

Instructions are contained at page 107 in the " Book of Arrangements," 1913.

8. LIST OF FELLOWS.

A list of all the Fellows of the Society is sent out in January. Fellows are requested to look at their own names in it, and if in any way these are incorrect, or the address insufficient, they are requested to inform the Secretary at once. Forms of Nomination, and of the Privileges of Fellows, are bound in with every number of the JOURNAL (Advt. pp. 32, 33) and the " Book of Arrangements."

9. NEW FELLOWS.

The President and Council fully appreciate how much the prosperity of the Society and its present large number of Fellows are due to the efforts of Fellows to enlist the sympathy of their friends ; and the steady advance during recent years indicates the increasing recognition of the Society's work and usefulness. But it must not be supposed that a maximum has yet been reached. There is ample room for a great increase of Fellows, especially in America and the Colonies.

10. AN APPEAL.

What has been accomplished for the Society since 1887 is largely due to the unwearied assistance afforded by a small proportion of the Fellows ; but as all belong to the same Society, so it behoves each one to do what he or she can to further its interests, especially by :—

1. Increasing the Number of Fellows.
2. Helping to swell the Fund for providing Prizes for the Students at Wisley.
3. Providing Lectures with Lantern Slides.
4. Presenting Books to fill the gaps in the Library both at Vincent Square and at Wisley.
5. Sending new or rare Plants and Seeds for the Garden and surplus Roots for distribution to the Fellows.
6. Sending Plants for the *New Rock Garden* at Wisley.

Thus there is plenty for all to do according to their individual liking : personal effort, money, plants, books, are all alike needed. The Secretary asks for help in the ways above indicated.

* Any special directions or conditions which the testator may wish to be attached to the bequest may be substituted for the words in brackets.

Since this notice last appeared, the President and Council have to acknowledge the gift of £5 from Miss Wilson for books for the Wisley Library, the promise of £5 from Mr. Jas. Hudson for prizes for the Wisley Students, a collection of dried specimens of flowers collected by the late Sir Hugh Low, from Miss Evelyn M. C. Kaye, and two framed coloured prints of fruits, dated 1732, sent anonymously.

11. R.H.S. GARDENERS' DIARY.

The R.H.S. Gardeners' Diary for 1914 will be issued in November. It will contain a considerable quantity of new information, and it has been compiled more especially for the single-handed gardener. The price is 1s. 1d., post free, from the R.H.S. Office, Vincent Square, London, S.W.; or 2s. 1d. if leather-bound.

12. LINDLEY LIBRARY.

The Society, acting in and through its Council, having now become sole trustee of the Lindley Library, Fellows and friends of the R.H.S. have the encouragement of knowing that their gifts to the Library can never be lost to the Society, but are attached to it in perpetuity. It should now be the aim of all to make the Library far more perfect and complete than it is at present. Gifts of books, old or new, will be gratefully accepted.

13. THE SOCIETY'S GARDENS AT WISLEY.

The Gardens are open daily to Fellows and others showing Fellows' Transferable Tickets, from 9 A.M. till sunset, except on Sundays, Good Friday, Christmas Day, and Exhibition Days. Each Fellow's Ticket admits three to the Gardens. The Public are not admitted.

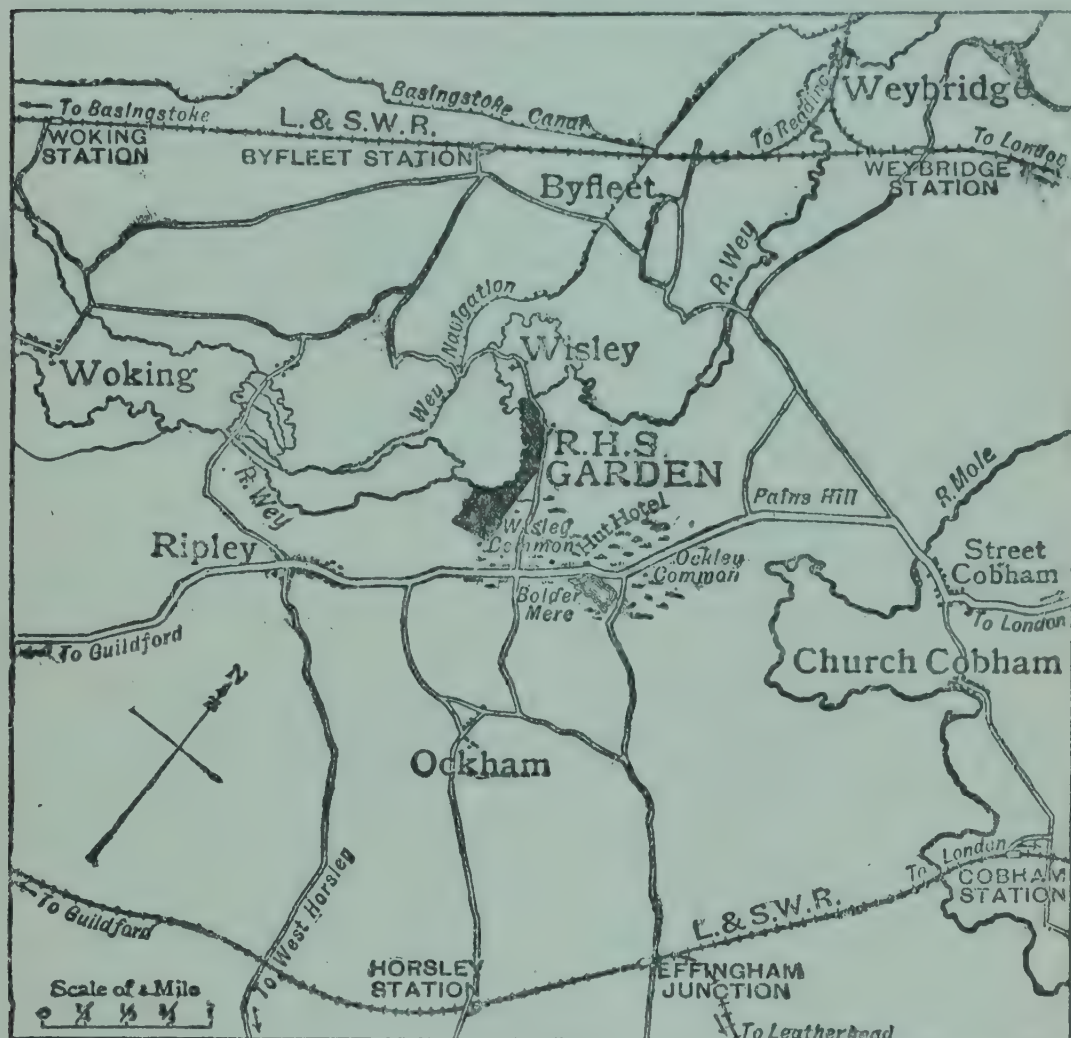
The Gardens, situated at Wisley (about 2 miles from Ripley, in Surrey), are about 3 miles from Byfleet, 3½ miles from Horsley, and 5½ miles from Weybridge, all stations on the South-Western Railway, with frequent trains from Waterloo and Clapham Junction. Carriages to convey four persons can be obtained by writing to Mr. D. White, fly proprietor, Ripley, Surrey; the charge being, to and from Weybridge, waiting two hours at the Gardens, 8s.; or waiting three hours, 10s.; or to and from Horsley, 7s.; Effingham Junction, 7s.; Byfleet, 7s. Visitors should in all cases be careful to state the trains they intend to arrive by and leave by. Carriages can also be obtained at Weybridge for 8s. by writing to Mr. Trembling, New Road, Weybridge. Excellent accommodation and refreshments can be had at the Hut Hotel, close to the Gardens, and also at the Hautboy at Ockham.

The motor route from London to Wisley will be found in the "Book of Arrangements," p. 146.

14. ROCK GARDEN AT WISLEY.

In consequence of the rapidly increasing interest taken in what are popularly called "Alpine Plants," "Alpines," or "Rock Plants," the Council have constructed a Rock Garden at Wisley on a somewhat

extensive scale. The idea is to obtain the best possible positions and soils for the different plants to grow in, the growth and well-being of the plants being considered to be of even greater importance than the artistic effect of the rockwork. In a Horticultural Society's Garden every single detail should teach something, so that Fellows visiting it may be able to take away an idea of how best to do this or that, or where best to plant this or that. The construction of the Rock Garden is completed, and the planting is proceeding, but it will be at least two years or more before the plants on it can be seen at their best



POSITION OF THE SOCIETY'S GARDENS.

An Alpine House has been built above the Rock Garden, chiefly for the purpose of growing rock plants to perfection which blossom too early to withstand our wet winters and late spring frosts. In this House Fellows may see such plants in flower from February onwards.

15. THE WISLEY RESEARCH STATION.

Investigations are now in full swing at the new Research Station and Laboratory at Wisley. All communications relating to them should be addressed to Mr. F. J. Chittenden, F.L.S., Director of the Research Work on Scientific Matters affecting Practical Horticulture and Lecturer to the Students.

16. STUDENTS AT WISLEY.

N.B.—There will be a few vacancies for the two years' Course commencing in September 1913. Early application should be made to the Secretary.

The Society admits young men, between the ages of sixteen and twenty-two years, to study Gardening at Wisley. The curriculum includes not only practical garden work in all the main branches of Horticulture, but also Lectures, Demonstrations, and Horticultural Science in the Laboratory, whereby a practical knowledge of Garden Chemistry, Biology, &c., may be obtained.

17. DISTRIBUTION OF SURPLUS PLANTS.

In a past Report the Council drew attention to the way in which the annual distribution of surplus plants has arisen. In a large garden there must always be a great deal of surplus stock, which must either be given away or go to the waste-heap. A few Fellows, noticing this, asked for plants which would otherwise be discarded ; and they valued what was so obtained. Others hearing of it asked for a share, until the Council felt they must either systematize this haphazard distribution or else put a stop to it altogether. To take the latter step seemed undesirable. Why should not such Fellows have them as cared to receive such surplus plants ? It was, therefore, decided to keep all plants till the early spring, and then give all Fellows alike the option of claiming a share of them by Ballot.

Fellows are, therefore, particularly requested to notice that only waste and surplus plants raised from seeds or cuttings are available for distribution. Many of them may be of very little intrinsic value, and it is only to avoid their being absolutely wasted that the distribution is permitted. The great majority also are, of necessity, *very small*, and may require careful treatment for a time.

Fellows are particularly requested to note that a Form of Application and list to choose from of the plants available for distribution is sent in January *every year* to every Fellow, enclosed in the " Report of the Council." To avoid all possibility of favour, all application lists are kept until the last day of February, when they are all thrown into a Ballot ; and as the lists are drawn out, so is the order of their execution, the plants being despatched as quickly as possible after March 1.

Of some of the varieties enumerated the stock is small, perhaps not more than twenty-five or fifty plants being available. It is, therefore, obvious that when the Ballot is kind to any Fellow he will receive the majority of the plants he has selected, but when the Ballot has given him an unfavourable place he may find the stock of almost all the plants he has chosen exhausted. A little consideration would show that all Fellows cannot be first, and some must be last, in the Ballot. Application forms received after March 1 and before April 30 are kept till all those previously received have been dealt with, and are then balloted in

a similar way. Fellows having omitted to fill up their application form before April 30 must be content to wait till the next year's distribution. The work of the Gardens cannot be disorganized by the sending out of plants at any later time in the year. All Fellows can participate in the annual distribution *following* their election.

The Society does not pay the cost of packing and carriage. The charge for this will be collected by the carriers on delivery of the plants, which will be addressed exactly as given by each Fellow on his application form. It is impracticable to send plants by post, owing to the lack of Post Office facilities for despatch without prepayment of postage.

Fellows residing beyond a radius of thirty-five miles from London are permitted to choose double the number of plants to which they are otherwise entitled.

Plants cannot be sent to Fellows residing outside the United Kingdom, owing either to length of time in transit or to vexatious regulations in some foreign countries ; but the Council will at any time endeavour to obtain for Fellows living abroad any unusual or rare seeds which they may have been unable to procure in their own country.

No plants will be sent to Fellows whose subscriptions are in arrear, or who do not fill up their forms properly.

18. EXHIBITIONS, MEETINGS, AND LECTURES IN 1914.

The programme will be found in the " Book of Arrangements " for 1914. An Exhibition and Meeting is held practically every fortnight throughout the year, and a short lecture on some subject connected with Horticulture is delivered during the afternoon.

A reminder of every Show will be sent in the week preceding to any Fellow who will send to the R.H.S. Offices, Vincent Square, S.W., a sufficient number (32) of halfpenny cards *ready addressed* to himself.

January	13, 27.
February	10 (Annual Meeting), 24.
March	10-11 (Forced Bulbs), 24.
April	7, 15-16 (Daffodils), 21, 23 (Spring Roses).
May	5, 19-21 (Chelsea), 25-29 (Rhododendrons).
June	3, 16, 30 (Holland House).
July	1-2 (Holland House), 14, 16 (Sweet Peas), 17 (Carnations), 28.
August	11, 25.
September	8 (Dahlias), 22 (Vegetables), 24 (Autumn Roses), 29-30 (Fruit Show).
October	6, 20.
November	3, 17.
December	1.

19. SPRING SHOW OF FORCED BULBS.

TUESDAY AND WEDNESDAY, MARCH 10 AND 11, 1914.

A Special Exhibition of Forced Spring Bulbs will be held on these days, the object being to demonstrate the varieties best suited for gentle forcing. Exhibits of small and large collections are invited from Amateurs and the Trade. R.H.S. Medals will be awarded according to merit.

HYACINTHS, TULIPS, AND DAFFODILS.

The Council also offer (subject to the General Rules of the Society) the following Prizes presented to them by the General Bulb Growers' Society of Haarlem:—

DIVISION I.—*For Amateurs.**

Class 3.—Eighteen Hyacinths, distinct.

1st Prize . . .	£6 6s.	4th Prize . . .	£3 3s.
2nd „ . . .	£5 5s.	5th „ . . .	£2 2s.
3rd „ . . .	£4 4s.	6th „ . . .	£1 1s.

Class 4.—Twelve Hyacinths, distinct.

1st Prize . . .	£5 5s.	4th Prize . . .	£2 2s.
2nd „ . . .	£4 4s.	5th „ . . .	£1 1s.
3rd „ . . .	£3 3s.		

* Class 5.—Six Hyacinths, distinct.

1st „ . . .	£2 2s.	3rd Prize . . .	£1 1s.
2nd „ . . .	£1 10s.	4th „ . . .	10s.

Class 6.—Four pans containing Hyacinths, ten roots of one variety in each pan. The blooms of each pan to be of distinctly different colour from those of the other three pans; the bulbs need not have been actually grown in the pans they are shown in.

1st Prize . . .	£4 4s.	3rd Prize . . .	£2 2s.
2nd „ . . .	£3 3s.	4th „ . . .	£1 1s.

Class 7.—The finest decorative display of Hyacinths grown from first size bulbs.

Only Prize—The Gold Medal of the General Bulb Growers' Society of Haarlem.

DIVISION II.—*For Trade Growers.*

Class 8.—The finest decorative display of Hyacinths grown from first size bulbs.

Only Prize—The Gold Medal of the General Bulb Growers' Society of Haarlem.

Regulations.—For classes 3, 4, and 5, each bulb must be in a separate

The Society only recognizes three divisions of growers:—

1. Amateurs growing for their own use or pleasure and employing assistance or otherwise.
2. Trade, growing for sale retail.
3. Market gardeners, growing wholesale for market.

pot (size optional). Classes 3, 4, 5, and 6 must be all single spikes ; no spikes may be tied together. Exhibitors may only compete in *one* of the classes 3, 4, and 5. All bulbs must have been forced entirely in Great Britain or Ireland. All varieties should be correctly named. Points will be deducted for all incorrect names.

BULBS GROWN IN MOSS FIBRE &C.

Subject to the General Rules of the Society, the Council also offer the following Prizes presented to them by Messrs. Robert Sydenham, Ltd. :—

Classes 8–10.—Bulbs grown in moss fibre or similar material (not earth) and without drainage.

Amateurs.

Class 8.—Six single Hyacinths, in separate vases, not exceeding six inches in diameter, to be selected from any one of the following varieties : ‘Boerhaave,’ ‘City of Haarlem,’ ‘Enchantress,’ ‘General Vetter,’ ‘Innocence,’ ‘Ivanhoe,’ ‘Jacques,’ ‘King of the Blues,’ ‘Koh-i-Noor,’ ‘Lady Derby,’ ‘La Grandesse,’ ‘Queen Mary,’ ‘Schotel,’ ‘Totula,’ and ‘Victory.’

Prizes, 21s., 17s. 6d., 15s., 10s. 6d., 7s. 6d.

Class 9.—Six vases of Tulips (vases not exceeding seven inches in diameter), no restriction as to the number of bulbs in a vase, to be selected from the following : ‘Couleur Cardinal,’ ‘Fabiola,’ ‘Golden Queen,’ ‘Joost van Vondel,’ ‘Keizerskroon,’ ‘Le Rêve,’ ‘Pink Beauty,’ ‘Prince of Austria,’ ‘Red Admiral,’ ‘Rose Luisante,’ ‘Van der Neer,’ ‘Vermilion Brilliant,’ and ‘White Joost van Vondel.’

Prizes, 21s., 17s. 6d., 15s., 10s. 6d., 7s. 6d.

Class 10.—Six vases of Narcissi (vases not exceeding seven inches in diameter), no restriction as to the number of bulbs in a vase, to be selected from the following : ‘Albatross,’ ‘Argent,’ ‘Artemis,’ ‘Cardinal,’ ‘Cresset,’ ‘Dairymaid,’ ‘Diadem,’ ‘Duchess of Westminster,’ ‘Firebrand,’ ‘Glitter,’ ‘Gloria Mundi,’ ‘Golden Bell,’ ‘Golden Nugget,’ ‘Horace,’ ‘Lilian,’ ‘Lucifer,’ ‘Madame de Graaff,’ ‘Mrs. C. Bowley,’ ‘Scarlet Runner,’ ‘Seagull,’ ‘Siddington,’ ‘Stonechat,’ ‘Victoria,’ and ‘White Lady.’

Prizes, 21s., 17s. 6d., 15s., 10s. 6d., 7s. 6d.

If there are more than six exhibits in either of the Classes 8–10 an extra prize of 7s. 6d. will be given in such class if there are eight exhibits ; a further 7s. 6d. if there are ten exhibits, and so on, in the proportion of one prize for every two exhibits exceeding six in each class. The exhibits in these classes must have been grown entirely in the receptacles in which they are shown.

20. THE "CLAY" CHALLENGE CUP FOR A NEW ROSE,

NOT IN COMMERCE, POSSESSING THE TRUE OLD ROSE SCENT.

Messrs. Clay have presented to the Council a Silver-gilt Cup of the value of £75 for annual competition (open to all) at the Holland House Show, its object being to endeavour to obtain a new race of Roses of both good form and colour, but above all else possessing the true old genuine Rose scent, such as may be found in the old Cabbage or Provence Rose, in 'General Jacqueminot,' 'Marie Baumann,' 'Duke of Wellington,' 'General McArthur,' &c. The distinctive scent known as "Tea Rose" is not, for the purpose of this competition, to be accounted as the true Rose Scent.

Not more than three different varieties may be shown by any one competitor, but at least three and not more than six cut blooms of each variety.

For five consecutive years Messrs. Clay will also present a smaller commemorative Cup, which the Council will give to the winner of the Challenge Cup when at the end of the twelve months it shall have been returned safely and in good condition.

The winner of one year may not win again the next year, but only in alternate years.

In any year the award of the Cup may be withheld if the Council are of opinion that there is no exhibit worthy of it.

The decision of the Council is final.

The Council will not award this high distinction unless satisfied and assured that the exhibit is, in the main, due to the work and capability of the exhibitor or his employes; on this point the Council may consult any expert not eligible to win the Cup.

The Council may reserve decision till the third day of the Show.

The attention of intending exhibitors is particularly directed to the Society's 1914 Code of "Rules for Judging."

21. TRIALS AT WISLEY, 1914-15.

N.B.—Everything sent for trial *must be named*, and the name and address of the sender attached, together with the name of the raiser and introducer as far as known.

FRUIT.

Melons.—Ten seeds of each variety to be sent in February.

FLOWERS.

Tulips—of all descriptions.—Five bulbs of each (named) to be sent at once. (See below.)

Herbaceous Phlox.—Three plants of each to be sent in February.

Early-flowering outdoor Chrysanthemums.—Three plants of each to be sent in March.

Pentstemons.—Three plants of each to be sent in March.

Perennial Sunflowers (including Heleniums and Rudbeckias).—
Three plants of each to be sent in February.

Asters—French, German, or China. Seed to be sent in February.

VEGETABLES.

Broccoli.—One packet of seed of each to be sent in February.

French Beans, outdoor.—One pint of seed of each to be sent in March.

TRIAL OF TULIPS.

In view of the confusion existing in the nomenclature of Tulips, the Council of the R.H.S. have been requested to draw up a list of synonyms, and have consented to do so with the co-operation of the Dutch growers. It is accordingly proposed to plant this autumn at Wisley (where Tulips do so well) as representative a collection of *all classes and descriptions* of Tulips as can be got together. Growers in Holland are asked to send over their bulbs to be grown side by side with those from English growers. Five bulbs of each variety should be sent at once. When they are in bloom a Joint Committee of Dutch and English Tulip specialists will be invited to meet at Wisley to determine the correct nomenclature. A synonymic list will then be prepared and issued in the JOURNAL of the Society. It is important that all bulbs sent should bear the name under which they are known to or sent out by the sender, and also an indication of their type—as Early, Late, Darwin, Parrot, Bizarre, Bybloemen, Rose, &c.

If sent by post: The Superintendent, R.H.S. Gardens, Wisley, Ripley, Surrey.

If sent by rail: The Superintendent, R.H.S. Gardens, Wisley, Horsley Station, L. & S.W.R., with advice by post to the Superintendent.

TRIAL OF HORTICULTURAL SUNDRIES.

Important Notice.

The Council will continue their Trial of Sundries in 1914 under the scheme which was brought into action this year. The system adopted has proved admirable after twelve months' practical test, and Sundriesmen are again invited to send their specialities (not more than three articles in any one year). Full particulars, with Entry Form, can be obtained from the Secretary, R.H.S., Vincent Square, S.W., upon receipt of a stamped addressed envelope.

22. SEEDLING DAHLIAS.

The trial of Dahlias, from a garden decorative point of view, carried out this year in the gardens of Reginald Cory, Esq., at Duffryn, has proved a genuine success, and in consideration of this, and desiring to encourage raisers still further to devote particular attention to producing varieties well adapted to garden decoration, Mr. Cory felt the desirability of holding a further trial next year, and, after putting his views before the Council of the Society and the National Dahlia

Society, and being assured of their willingness to co-operate with him as they did this year, he has decided to hold a trial in 1914 of seedlings not in commerce, and any varieties offered for the first time in 1914.

These will be grown and judged and reported on in exactly the same way, and as far as possible by the same individuals, as in 1913. Three plants of each variety should be sent, carriage paid, to Reginald Cory, Esq., Duffryn, Cardiff, if sent by post; or labelled per G.W.R. to Ely station, near Cardiff, if sent by rail. For various considerations it has been decided that only rooted cuttings must be sent, and those who intend participating in the trials are particularly requested to send them as early as possible in the new year, in order that they may be grown on to the best advantage before planting out. Mr. Cory kindly offers the Council a £5 5s. Cup to be awarded to the most meritorious plant, and the Council will give any other awards they think fit.

23. DAHLIA PRIZES AT THE R.H.S. MEETING ON SEPTEMBER 8, 1914.

The object of this competition is not so much to attract the finest cut blooms as seen on the Show stand, for such flowers may, when growing on the plant, be almost invisible, and no contribution to the decoration of the Garden, whatever they may be for cutting. The object is to discover the most Decorative Garden Dahlias—that is, those varieties which add most to the beauty of the Garden, and, as is well known, not a few of the most glorious Dahlia flowers add nothing to the aspect of the Garden as they are hidden beneath the foliage. They may be excellent to grow in the Kitchen Garden to cut for house decoration, but they are useless for the ornamentation of the Pleasure Garden. (See paragraph 22.) So-called Show Dahlias *may* also be Decorative and therefore eligible.

SCHEDULE.

Class A. Amateurs. A group of Decorative Garden Dahlias of all or any sections. Twelve feet run of 3 feet tabling, not to be built up more than 8 feet in height from the ground level.

First Prize: R.H.S. Silver Cup, to which will be added the Veitch Memorial Medal.

The Council may make other awards according to merit.

Class B. Open. A group of Decorative Garden Dahlias of all or any sections. Twenty-five feet run of 3 feet tabling, not to be built up more than 8 feet in height from the ground level.

First Prize: Seventy-five Guinea Challenge Cup, presented to the R.H.S. by Reginald Cory, Esq.

The Council will make other awards according to merit.

In both Classes all the stems must touch the water, and no wiring or artificial support will be allowed. Hardy foliage or grasses may be employed for decoration.

The winner will hold the Cory Cup for one year, subject to a suffi-

cient insurance against loss, and to a guarantee to return it in good condition, or, failing this, to refund to the R.H.S. the sum of eighty guineas. On the return of the Cup the Council will present the holder with a smaller commemorative Silver Cup.

The same exhibitor may win the Cup only once in three years, but should the winner of the previous year be again considered first the Council will bestow a special award.

The decision of the Council is final, and the Cup may be altogether withheld at their discretion.

The Council will not award this high distinction unless satisfied and assured that the exhibit is, in the main, due to the work and capability of the exhibitor or his employés, and on this point the Council may consult any expert not competing for the Cup.

The attention of intending exhibitors is particularly directed to the Society's 1911 Code of "Rules for Judging."

24. A NATIONAL DIPLOMA IN HORTICULTURE.

Most gardeners will welcome the initiation by the Society of a scheme whereby a National Diploma in Horticulture may be gained by those who pass the Preliminary and Final Examinations which will be required. The Diploma will be thoroughly "National," for by the consent of H.M. Government the Department of Agriculture, after being approached in the matter, has consented to co-operate with the Society if the Society will undertake the work of organizing the Examinations, and has authorized that the Diploma shall bear the following words: "Awarded by the Royal Horticultural Society under a scheme approved by the Board of Agriculture."

The Examinations will be written, viva voce, and practical. The practical part will be held in suitable gardens at convenient centres in the country. The first Diploma Examination will be held in June 1914, and thereafter annually.

Among those for whose benefit the Diploma is established are the following:—Florists, Fruit Growers, Gardeners, Horticultural Inspectors, Horticultural Instructors, Landscape Gardeners, Market Gardeners, Nurserymen, Public Park Gardeners, and Seedsmen.

Fuller information may be obtained from the Secretary, Royal Horticultural Society, Vincent Square, S.W.

25. EXAMINATIONS, 1914.

1. The Annual Examination in the Principles and Practice of Horticulture will be held on April 1, 1914. The Examination has two divisions, viz. (a) for Candidates of eighteen years of age and over, and (b) for Juniors *under* eighteen years. Particulars for 1914 may be obtained by sending a stamped and directed envelope to the Society's offices. Copies of the Questions set from 1893 to 1913 (price 2s. post free) may also be obtained from the office. The Society

is willing to hold an Examination wherever a magistrate, clergyman, schoolmaster, or other responsible person accustomed to examinations will consent to supervise one on the Society's behalf.

The Examination will not be held outside the British Isles until further notice.

In connexion with this Examination a Scholarship of £25 a year for two years is offered by the Worshipful Company of Gardeners, to be awarded after the 1914 Examination to the student who shall pass highest, if he is willing to accept the conditions attaching thereto. The main outline of these conditions is that the holder must be of the male sex, and between the ages of 18 and 22 years, and that he should study gardening for one year at least at the Society's Gardens at Wisley, conforming to the general rules laid down there for Students. In the second year of the Scholarship he may, if he like, continue his studies at some other place at home or abroad which is approved by the Council of the Society. In case of two or more eligible students being adjudged equal, the Council reserve to themselves the right to decide which of them shall be presented to the Scholarship.

2. The Society will also hold an Examination in Cottage Gardening on April 22, 1914. This Examination is intended for, and is confined to Elementary and Technical School Teachers. It is undertaken in view of the increasing demand in country districts that the Schoolmaster shall be competent to teach the elements of Cottage Gardening, and the absence of any test of such competence. The general conduct of this Examination is on similar lines to that of the more general Examination. Questions on Elementary Chemistry and Biology are included in this Examination.

Medals and Certificates are awarded and Class Lists published in connexion with these Examinations. The Syllabus may be obtained on application to the Secretary, R.H.S., Vincent Square, Westminster, S.W.

26. INFORMATION.

Fellows may obtain information and advice from the Society as to the names of flowers and fruit, on points of practice, insect and fungoid attacks, and other questions, by applying to the Secretary, R.H.S., Vincent Square, Westminster, S.W. Where at all practicable it is particularly requested that letters and specimens may be timed to reach Vincent Square by the first post on the mornings of the Fortnightly Meetings, so as to be laid before the Scientific or other Committees at once.

27. INSPECTION OF FELLOWS' GARDENS.

The Inspection of Gardens belonging to Fellows is conducted by a thoroughly competent Inspector from the Society, who reports and advises at the following cost—viz. a fee of £3 3s. for one day (or £5 5s. for two consecutive days), together with all out-of-pocket expenses. No

inspection may occupy more than two days, save by special arrangement. Fellows wishing for the services of an Inspector are requested to give at least a week's notice and choice of two or three days, and to indicate the most convenient railway station and its distance from their Gardens. Gardens can only be inspected at the *written* request of the *owner*.

28. AFFILIATION OF LOCAL SOCIETIES.

One of the most successful of the many new branches of work undertaken since the reconstruction of the Society in 1887 is the unification of local Horticultural Societies by a scheme of affiliation to the R.H.S. Since this was initiated no fewer than 330 Societies have joined our ranks, and the number is steadily increasing.

Secretaries of Affiliated Societies can obtain on application a specimen of a Card which the Council have prepared for the use of Affiliated Societies for Certificates, Commendations, &c. Price 3s. 6d. for 10 copies, 5s. 6d. for 20, 11s. 6d. for 50, 20s. for 100. (See next par.)

The Council have also struck a special Medal for the use of Affiliated Societies. It is issued at cost price in Bronze, Silver, and Silver-gilt—viz. Bronze, 5s. 6d., with case complete; Silver, 12s. 6d., with case complete; Silver-gilt, 16s. 6d., with case complete. Award Cards having the Medal embossed in relief can be sent with the Medal if ordered, price 6d. each.

29. AFFILIATED SOCIETIES' CERTIFICATE CARDS.

At the request of several of the Affiliated Societies, the Council have had the Certificate Card (issued some years ago for the use of Affiliated Societies) beautifully coloured. The uncoloured Card will still continue to be issued at the old prices, and the new coloured Card at 8d. a single copy, or 10 for 5s., post free.

30. RULES FOR JUDGING—1914 CODE.

The "Rules for Judging, with Suggestions to Schedule Makers and Exhibitors," have been revised, and the new edition is now ready. It contains several important amendments, and special attention is drawn to new "Rules for Judging Cottage and Allotment Gardens" with the companion "Judges' Point Sheet," and a "Classification of Stove, Greenhouse, and Hardy Plants for Show Purposes." The Secretaries of Local Societies are advised to obtain a fresh copy. It will be sent post free on receipt of a postal order for 1s. 6d., addressed to the Secretary, Royal Horticultural Society, Vincent Square, Westminster, S.W.

31. RULES FOR JUDGING COTTAGE AND ALLOTMENT GARDENS.

To assist Allotment holders and Cottage Gardeners in their competitions, a set of Rules, with hints to both Exhibitors and Judges, has been drawn up. These Rules may be had at twopence a copy, or fifty for 7s. 6d.

A companion Judges' Sheet in a very convenient book-like form can also be had for 2s. a dozen. This Judges' Sheet has, in tabulated form, a list of the subjects usually grown in allotment gardens, flower gardens, and for window and wall decoration. The allotments or gardens to be judged are all numbered, and columns are provided in the judging sheet for the points given.

32. R.H.S. DAFFODIL YEAR BOOK.

The Council have consented to publish on August 1st a "Daffodil Year Book." It will contain the most up-to-date information regarding new varieties of Daffodils; the Awards made at the 1914 Daffodil Shows in London, Birmingham, and elsewhere; special articles, illustrative plates, and the Schedule for the 1915 R.H.S. Daffodil Show. The Year Book for 1913 is already sold out, so that all who are interested in these beautiful Spring flowers are advised to order a copy of 1914 at once from the Society's Office, Vincent Square, London, S.W. Price 2s. 6d. post free.

33. DISBUDDING OF ORCHIDS.

At the request of the Orchid Committee the Council have made a rule that "Awards will not be given to any Orchids of which the natural size and character of the flowers have, in the opinion of the Orchid Committee, been in any way changed or improved through the removal of a bud or buds, or part of the spike."

34. DISBUDDING CHRYSANTHEMUMS.

When single-flowered Chrysanthemum plants are submitted for certificate one plant must be shown without any disbudding whatsoever, and one plant somewhat disbudded, in order that the quality of the blooms on the undisbudded stems may be compared with those on the disbudded stems.

35. ADVERTISEMENTS.

Fellows are reminded that the more they can place their orders with those who advertise in the Society's Publications the more likely others are to advertise also, and in this way the Society may be indirectly benefited.

